COMPARATIVE STUDY OF NEBULIZED DEXMEDETOMIDINE AND DEXAMETHASONE IN PREVENTING SORE THROAT FOLLOWING ENDOTRACHEAL INTUBATION

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Submitted By

DR. LIVLEEN DEEP MANN

DEPARTMENT OF ANAESTHESIOLOGY
DAYANAND MEDICAL COLLEGE AND HOSPITAL
LUDHIANA, PUNJAB

DECLARATION BY THE CANDIDATE

I hereby declare that the thesis entitled **"COMPARATIVE STUDY OF NEBULIZED DEXMEDETOMIDINE AND DEXAMETHASONE IN PREVENTING SORE THROAT FOLLOWING ENDOTRACHEAL INTUBATION"** submitted towards partial fulfillment of the requirements for the award of **MD IN ANAESTHESIOLOGY** degree to BFUHS is a compilation of original work carried out by me under the supervision of **Dr. Gurpreeti Kaur,** Associate Professor, Department of Anaesthesiology & **Dr. Suneet Kant Kathuria,** Professor & Head, Department of Anaesthesiology. No part of this thesis has formed the basis for the award of any degree previously.

_____

DR. LIVLEEN DEEP MANN
Department of Anaesthesiology
Dayanand Medical College & Hospital,
Ludhiana, Punjab

Date:

Place:

CERTIFICATE OF SUPERVISORS

This is to certify that the work incorporated in this thesis entitled **"COMPARATIVE STUDY OF NEBULIZED DEXMEDETOMIDINE AND DEXAMETHASONE IN PREVENTING SORE THROAT FOLLOWING ENDOTRACHEAL INTUBATION"** has been carried out by **Dr. Livleen Deep Mann** under our direct supervision. The data incorporated in this thesis is original and genuine and has been carried out by the candidate herself.

Signature of Supervisor **Signature of Co-Supervisors**

Dr. Gurpreeti Kaur
Associate Professor
Department of Anaesthesiology
DMCH, Ludhiana

Dr. Suneet Kant Kathuria
Professor & Head
Department of Anaesthesiology
DMCH, Ludhiana

Date:

ENDORSEMENT BY THE HEAD OF THE INSTITUTE

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Dr. Sandeep Puri
Principal
DMC&H, Ludhiana

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Signature

Dr. Livleen Deep Mann
Department of Anaesthesiology
Dayanand Medical College & Hospital,
Ludhiana, Punjab

Date:

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Dedicated

to

my Family

&

Teachers

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Dr Livleen

LIST OF ABBREVIATIONS

- **ASA** - American Society of Anesthesiologists
- **cc** - cubic centimetre
- **cm** - centimetre
- **DBP** - Diastolic Blood Pressure
- **ETT** - Endotracheal Tube
- **hr** - Hour
- **HR** - Heart Rate
- **ID** - Internal Diameter
- **Kg** - Kilograms
- **LMA** - Laryngeal Mask Airway
- **MAP** - Mean Arterial Pressure
- **MgSO4** - Magnesium Sulphate
- **mg** - Milligram
- **ml** - Millilitre
- **mm** - millimeter
- **N2O** - Nitrous Oxide
- **ng** **-** nanogram
- **PACU** - Post Anethesia Care Unit
- **PONV** - Post Operative Nausea Vomiting
- **POST** - Post Operative Sore Throat
- **SBP** - Systolic Blood Pressure
- **ug** - Microgram
- **W/V** - Weight/Volume

ABSTRACT

Introduction: Post Operative Sore Throat (POST) is a common adverse effect in the postoperative recovery period following surgeries under general anaesthesia with endotracheal intubation. It causes significant agony to the patient bringing displeasure during recovery from anaesthesia with reported incidence of 21-71.8%. Nebulised Dexmedetomidine and Dexamethasone are being used in preventing post operative sore throat but very limited studies have been done to compare the effect of two drugs.

Aim of Study: We aimed to compare the effectiveness of role of Dexmedetomidine nebulisation with Dexamethasone in attenuating Post Operative Sore Throat after general anaesthesia endotracheal intubation.

Materials & methods: A randomized, double blind clinical study was conducted in department of Anaesthesia, Dayanand Medical College on a total of 150 patients ≥18 years of age with ASA I–III scheduled for elective operative procedure under general anaesthesia with endotracheal intubation. The enrolled study participants were randomised into three groups of 50 each. Group I comprising of 50 patients who received nebulized Dexmedetomidine 50ug (0.5 ml) with 4.5 ml of normal saline (total volume =5ml) and Group II Comprising of 50 patients received nebulized dexamethasone 8mg (2ml) with 3 ml of normal saline (total volume=5ml). Third group (Group III) was control group of 50 patients who received normal saline. Drugs were delivered using a nebulisation mask for 10 minutes, 15 minutes prior to induction of general anaesthesia with endotracheal intubation. Patients were assessed in the postoperative ward for incidence of sore throat, hoarseness, throat pain and other side effects .

Results: Incidence of sore throat was highest in control group, significant difference was seen from both Dexmedetomidine and Dexamethasone group in first 8 hours. There was higher incidence of Grade 2 sore throat in control group when compared to Dexmedetomidine and Dexamethasone. Incidence of hoarseness was significantly lower in patients nebulised with Dexmedetomidine and Dexamethasone when compared to control group till first 24 hours. Control group had lower grades of throat pain in patients nebulised with Dexmedetomidine and Dexamethasone. No significant difference was seen in incidence of cough in three groups.

Conclusion: Nebulised Dexmedetomidine (50 ug) and Dexamethasone (8 mg) before intubation can significantly reduce the incidence and severity of post operative sore throat and cause no adverse effects.

Keywords: Dexmedetomidine, Dexamethasone, post operative sore throat, nebulisation

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KEY TO MASTER CHART

✓ BSO	Bilateral salpingo-oophorectomy
✓ CAD	Coronary Artery Disease
✓ CKD	Chronic Kidney Disease
✓ Chole	Cholecystectomy
✓ ETEP	Extended Totally Extra Peritoneal Repair
✓ F	Female
✓ FESS	Functional endoscopic sinus surgery
✓ Lap	Laproscopic
✓ LAR	Low Anterior Resection
✓ M	Male
✓ tlh	total laproscopic hysterectomy
✓ TAH	Total Abdominal Hysterectomy

INTRODUCTION

Post Operative Sore Throat (POST) is a common adverse effect in the postoperative recovery period following surgeries under general anaesthesia with endotracheal intubation. It causes significant agony to the patient bringing displeasure during recovery from anaesthesia with reported incidence of 21-71.8%.[1,2] Endotracheal intubation related sore throat after operation is found to be the second most common anesthesia related complication after nausea and vomiting; it results in patient dissatisfaction and may even increase hospital stay.[3] Sore throat encompasses a wide range of conditions including pharyngitis, laryngitis, tracheitis, cough, hoarseness or dysphagia.[4]

While performing direct laryngoscopy a forward and upward force is applied on the laryngoscope handle to align visual, oral, pharyngeal and laryngeal axes. The force is transferred to arytenoids cartilages of larynx and may damage the mucosa of delicate airway that may cause trauma to the glottis resulting in POST.[5] Even for extremely brief periods, intubations may cause laryngeal injury. Vocal cord erythema, ulcers, granulomas and less frequently vocal cord immobility are among the possible injuries. Many patients have temporary vocal fatigue, dysphagia, painful throat, hoarseness and throat clearing after being extubated.[6] Mechanical or chemical stimuli activate sensory receptors distributed along the respiratory tract and evoke cough. It is essentially a reflex for airway protection.[7] During emergence or during lighter planes, endotracheal tube may irritate the trachea and laryngeal mucosa leading to cough. Cough can remove respiratory secretions and decrease the risk of aspiration but it activates sympathetic nervous system leading to tachycardia, hypertension, intracranial hypertension and surgical side bleed.[8]

Factors contributing to postoperative sore throat include prolonged intubation, large sized non lubricated cuffed endotracheal tube, prolonged intubation, multiple intubation attempts, blood and secretions causing mucosal irritation, high intracuff pressure, use of throat packs,

high anesthetic gas flows and preoperative risk factors such as dry cough.[9]

High endotracheal tube cuff pressure can lead to mucosal injury and POST. It is important to determine cuff seal point after tracheal intubation, intermittent measurement and adjustment of cuff pressure. Inflating the cuff with gas drawn from breathing circuit or with saline will avoid the problem of N_2O diffusion.[10] Both tracheal and cuff compliance influence intracuff pressure. Mechanical compression from a high intracuff pressure results in mucosal hypoperfusion, ischaemia, ulceration and pain. Intraoperative cuff pressure monitoring by manometer reduces the incidence and severity of POST.[11]

The severity of Post operative sore throat is at its peak two to four hours after extubation and decreases gradually in 24 hours. The highest POST incidence is observed after tracheal intubation (14.4-50%) as compared to laryngeal mask (5.8-34%) and open mask (3.3%).[10] It is difficult to control sore throat, even when operative pain has been successfully controlled by the administration of systemic analgesics. Therefore, the prevention of post operative sore throat is an important issue. Numerous pharmacological and non pharmacological methods have been used in the past for minimising post operative sore throat with varying outcome.

Nebulisation therapy, preferable and safe method of drug delivery has been shown to be effective in POST prevention in many studies. However the relative efficacy of various nebulised agents remains unknown. Prophylactic use of nebulised corticosteroid, magnesium sulphate, Ketamine can effectively prevent post operative sore throat. Ashwani H, Seema K and Lavanya R studied comparison of nebulised Dexamethasone and nebulised magnesium sulphate in preventing POST following endotracheal intubation. In this prospective double blind study 90 patients were divided into two equal groups. Group D received Dexamethasone 8 mg with 3ml saline nebulisation and Group M received magnesium sulphate (50% W/V 2ml) with 3 ml normal saline nebulisation 30 min before the induction of anaesthesia. In Group D number of patients having POST was significantly less in

comparison to Group M at 0, 4, 8 and 12 hr. None of the patients had any hoarseness in Group D at 0, 4, 8 hr postoperatively.[12] However additional studies with a larger sample size, better design and more detailed outcomes are recommended to derive definitive conclusions regarding the optimal dose and risk of these therapies.[13] Post operative sore throat affects patient satisfaction post surgery and increases patient morbidity.

Nebulisation therapy is widely used to prevent POST. It is highly recommended because of a small volume of drugs required for effect, easy way of administration, better patient compliance, and most importantly little risk of adverse events compared with other routes of drug administration.[13]

Nebulisations are better accepted and tolerated by the patients than gargle, as it spares them from bitter taste of the drug. The risk of aspiration is also less likely as only reduced volume is administered when compared to the volume needed for gargle.[2]

Corticosteroids are used in perioperative period to enhance the effects of analgesics and antiemetics. Dexamethasone is a potent corticosteroid with anti-inflammatory and immunosuppressant effects with role in preventing the incidence of POST.[12] Steroids have anti-inflammatory functions and are widely used in common practice. Inhaled corticosteroids deliver the drug to the site of action where it is used in patients with airway diseases without systemic effects. Preoperative nebulisation with Dexamethasone reduces the incidence and severity of POST in patients receiving general anesthesia with endotracheal intubation without causing much systemic side effects. Topical Dexamethasone is equally effective to intravenous Dexamethasone in decreasing incidence of POST.[14]

Dexmedetomidine is alpha 2 adrenoreceptor agonist which causes anxiolysis, analgesia, sympatholysis and has opioid sparing properties. It induces a unique sedative response which shows transition from sleep to wakefulness thus allowing patient to be cooperative and communicative when stimulated. Dexmedetomidine functions by stimulating pre and post synaptic alpha 2 adrenoreceptors within the

central nervous system, leading to hyperpolarization of noradrenergic neurons, induction of an inhibitory feedback loop and reduction in norepinephrine secretion causing a sympatholytic effect, in addition to its anti-inflammation , sleep induction , bowel recovery and sore throat reduction effects.[15] The reduction in incidence of POST is attributed to the anti inflammatory effect of Dexmedetomidine, mediated by alpha 2 receptor.[16]Studies on animals have demonstrated that Dexmedetomidine reduces serum and tissue inflammatory mediators such as TNF alpha, IL 6, IL 1 beta, NF –Kb, and TLR4.[17,18] Many of these findings have been confirmed in human studies where Dexmedetomidine is reported to reduce C reactive protein, TNF alpha, IL6, IL1 beta and alters several mediators.[19,20] Perioperative intravenous administration of Dexmedetomidine has a positive effect on the prevention of POST. Dexmedetomidine has already been in use in nebulised form as being highly lipid soluble agent, it has good systemic absorption on transmucosal administration. Preoperative Dexmedetomidine nebulisation can be utilized as a safe and ideal alternative for nebulisation in attenuating postoperative sore throat, with less haemodynamic derangement.[3]

A prospective randomized trial conducted by Sharma S et al to study decrease of POST and hoarseness by Dexamethasone and comparing the intravenous, topical or nebulization route. They concluded that nebulisation is most effective method in decreasing POST as well as hoarseness.[21]

There is a dirth of literature on role of nebulized Dexmedetomidine in attenuating POST. So we planned to compare preoperative dexmedetomidine nebulisation with nebulized Dexamethasone in attenuating post operative sore throat following endotracheal intubation.

AIMS AND OBJECTIVES

To compare the effectiveness of nebulized dexmedetomidine with dexamethasone in preventing Post Operative Sore Throat following endotracheal intubation.

REVIEW OF LITERATURE

Postoperative sore throat is experienced by patients after general anesthesia with endotracheal intubation, although considered as a relatively minor complication, may increase hospital stay and increases patient discomfort. Tracheal intubation is associated with a greater risk of postoperative sore throat than when either a supraglottic airway device or facemask is used. When inserting a tracheal tube, there may be coughing or movement due to inadequate anesthesia or neuromuscular blockade making glottic exposure difficult and airway trauma more common.[13]

In the year 2021, Sharma S, Bhardwaj V. et al. conducted a prospective randomized trial to study decrease of POST and hoarseness by dexamethasone and comparing the intravenous, topical or nebulization route. They concluded that nebulisation is most effective method in decreasing POST as well as hoarseness. [21]

Edakkattil Ramesh kumar, Pratibha Ajay kumar et al. conducted study in the year 2017 on postoperative sore throat in patients undergoing head and neck surgeries under endotracheal intubation and laryngeal mask anesthesia. Total 100 subjects of age 10-79 years of both genders were included. The pain was measured as pain score during different cuff pressure and size of tube or mask and data was statistically analyzed .They concluded that postoperative sore throat can be effectively reduced by LMA .The pain score and frequency of patients with pain in the LMA group was less than that of ETT group but they were not able to find any correlation of pain score with different cuff pressure and size of tube or mask.[22]

Excessive cuff pressure can damage tracheal mucosa by direct trauma and reduction in blood flow.[13] Several studies have suggested a cuff pressure within range of 20-30 cm H2O as optimal. Even though cuff pressure manometers are now available for assessing the adequacy of cuff pressure they are not widely used as clinicians still depend on subjective methods like pilot balloon palpation or appreciation of audible air leak. However Sangeetha and Jacob et al. in the year 2016,

enrolled 150 ASA I–II patients who were intubated by anesthesiologists with minimum five years of experience. Cuff pressure was considered high if it was >30 cm H_2O and low if <20 cm of H_2O. The anesthesiologists were able to inflate the cuff to an optimal cuff pressure only in 64% cases. The cuff pressures were recorded as low in 17.3% while in 18.7% of cases the cuff pressure reached above the optimal range. They concluded that even experienced anesthesiologists are not able to inflate the endotracheal cuff upto optimal cuff pressure using subjective assessment alone in all cases.[23]

Cuff pressure should be inflated to the minimum volume at which no air leak is present with positive pressure inspiration; the cuff pressure should be less than 25 cm H_2O.Excessive cuff pressure may result in tracheal mucosal injury, vocal cord dysfunction from recurrent laryngeal nerve palsy and sore throat.[24]

Kamimurab, Nakanishi et al. in the year 2020 conducted a single centre propensity score-matched analysis to study the effects of the anesthesiologists experience on postoperative hoarseness after double lumen endotracheal tube intubation. They divided patients into two groups, in one group patients were intubated by a trainee anesthesiologist with <2 years of experience and the other group comprised of patients who were intubated by senior anesthesiologist with ≥2 years of experience There was a total of 256 eligible patients of which 153 underwent intubation by trainee anesthesiologists and the remaining 103 patients were intubated by senior anesthesiologist. They concluded that the incidence of hoarseness 24 hr after surgery was significantly higher in patients who were intubated by a trainee anesthesiologist than in patients who were intubated by senior anesthesiologist.[25]

In the year 2015, Salama and Badawy et al. conducted a study on role of Dexamethasone in decreasing the incidence of postextubation sore throat. A total of 120 patients were randomly assigned to two groups of 60 each, group D received dexamethasone 8 mg in 5 ml nebulisation and group S considered as control received normal saline in 5 ml

nebulisation 15 minute before general anesthesia was induced. The incidence and severity of postoperative sore throat were graded using a four-point scale (0-3) which was significantly lower in group D than in group S at 2 hr, 4 hr, 8 hr, 12 hr and 24 hr. They concluded that preoperative nebulisation with dexamethasone 8 mg reduces the incidence and severity of postoperative sore throat in patients receiving general anesthesia with endotracheal intubation.[14]

Paul and Gangwar et al. in the year 2003, conducted a randomized, double blind comparative study over a period of 18 months to evaluate the efficacy of nebulised Budesonide and Dexamethasone in reducing postoperative sore throat in patients undergoing elective lumbar spine surgery in prone position. Patients aged 18-65 years were randomly allocated into two equal groups of 60 patients, labelled B and D, based on computer generated random sequence of numbers. Patients belonging to Group B received 500 mcg Budesonide inhalation suspensions (total volume 4ml), using a nebulizer. In Group D, 8 mg of dexamethasone in 2 ml of normal saline (total volume 4 ml) was used. They concluded that a single prophylactic preinduction nebulisation of patients undergoing elective lumbar spine surgery in prone position with Dexamethasone is better than budesonide in preventing POST.[4]

Kuriyama et al. performed a systematic review and meta-analysis to assess the efficacy and safety of aerolised corticosteroids in prevention of post operative sore throat in adults undergoing tracheal intubation for surgery.[26] Nine randomized controlled trials involving 984 patients were included. Trial sequential analysis suggested that compared with non analgesic control, aerosolized corticosteroids were associated with a reduced incidence and decreased severity of POST but the evidence for efficacy and safety was limited and not definitive.

Ashwini H and Seema Kumari et al in the year 2018, conducted a prospective double blind study to compare Dexamethasone nebulisation and Magnesium Sulphate in preventing post operative sore throat following endotracheal intubation. A total of 90 ASA I and ASA II physical status patient aged between 20 to 50 yrs scheduled for elective surgery under general anesthesia, were allocated by simple

chit picking method into two groups of 45 patients each. Group D received Dexamethasone 8mg [2ml] with 3ml of normal saline for nebulisation. Group M received $MgSO_4$ [50% W/V 2ml] with 3ml of normal saline for nebulisation 30 min before the induction of anesthesia. Patients were assessed in the postoperative ward for the incidence of sore throat, discomfort, pain and other symptoms. They concluded that preoperative Dexamethasone nebulisation just before induction of anaesthesia is an effective method of reducing the incidence and severity of POST following endotracheal intubation and is more effective than magnesium sulphate.[12]

Mohamed et al conducted study in 2021,to study role of nebulised Dexamethasone in reducing incidence of sore throat in 60 subjects. Group D was nebulised with 8 mg Dexamethasone in 5 ml Normal saline and Group S was nebulised with 5 ml normal saline. They concluded that incidence of POST was 6.7 % after one nebulised dose of Dexamethasone and hence nebulized dexamethasone attenuates the incidence and severity of POST following general anesthesia with endotracheal intubation.[27]

Mostafa RH, Saleh AH, Hussein MM conducted study in the year 2018, to compare the effects of prophylactic Ketamine, Magnesium Sulphate and Dexamethasone nebulisation on POST on children from 6-16 years of age .Group K(Ketamine group) received 1mg/kg Ketamine nebulization , Group M (Magnesium Sulphate) received 40 mg /kg Magnesium Sulphate and Group D (Dexamethasone)received 0.16 mg of fixed dose .They concluded that preoperative nebulisation with Ketamine was more effective in pediatric patients postoperatively.[28]

In the year 2020, Thomas et al conducted a randomized, double blind, comparative study of Dexmedetomidine nebulisation with Ketamine in attenuating post operative sore throat in patients undergoing thyroidectomy. Patients were randomly allocated into two groups of 50 each; group 1 received Ketamine 50mg with 4ml saline nebulisation, while group 2 received Dexmedetomidine 50 ug with 4 ml saline nebulisation for 15 minutes. They found no significant difference in the incidence of POST between two groups but severity of sore throat was

significantly lower in both groups They deduced that preoperative dexmedetomidine nebulisation can be utilized as a safe and ideal alternative to Ketamine nebulisation with less haemodynamic derangements.[2]

Jandial K and Tabassum S conducted study on 100 ASA I and II adults, who were scheduled to undergo elective thyroid surgery under general anesthesia. Group A received 50 mg Ketamine with saline 4ml nebulisation .Group B received dexmedetomidine 50 ug(1ml) with saline (4 ml) nebulisation. They concluded that incidence of POST was 14.58% in Ketamine and 16.66% in Dexmedetomidine group. POST persisted for a longer duration in Ketamine group as compared to Dexmedetomidine group. There was significant reduction in severity of sore throat in both groups at all time points during 24 hours.[29]

Antilla M, Pentilla J et al. in the year 2003, conducted a study on bioavailability of Dexmedetomidine after extravascular doses in healthy subjects. Single 2 μg kg^{-1} dose of Dexmedetomidine was given intravenously, intramuscularly, perorally and buccally (where the solution is not swallowed) to 12 healthy male subjects. The drug concentration-time data were analysed using linear one-compartment (buccal and peroral data), or two-compartment modelling (intravenous data), or noncompartmental methods (intramuscular data). Mean (95% CI) absolute bioavailability after peroral, buccal and intramuscular administration was 16% (12–20%), 82% (73–92%) and 104% (96–112%), respectively. Dexmedetomidine is well absorbed through oral mucosa and therefore buccal dosing may provide an effective, non invasive route to administer drug. Bioavailability through nasal mucosa is 65% and by buccal mucosa is 82%.[30]

In the year 2004, Groeben H studied the effects of alpha 2 adrenoceptor agonist dexmedetomidine on bronchoconstriction. They concluded that dexmedetomidine has direct actions on peripheral receptors. When alpha 2 receptors are activated due to relaxation of smooth muscle and dilation of bronchi, there is reduction in cough reflex.[16]

In the year 2019, Gu W, Xu M et al conducted a randomized trial to study the use of nebulised 0.6 ug/kg Dexmedetomidine and nebulised 2% Lidocaine as premedication for flexible bronchoscopy. Sixty patients requiring flexible bronchoscopy were randomly assigned to three groups of 20 patients each. Group 1 received nebulised Dexmedetomidine and lidocaine, group 2 received intravenous Dexmedetomidine and nebulised Lidocaine, group 3 received nebulised Lidocaine alone. They noticed that nebulised Dexmedetomidine showed a protective effect for reducing cough compared with intravenous Dexmedetomidine. The group in which nebulised dexmedetomidine was given had a shorter recovery time and reduced vasoconstrictor consumption. The incidence of moderate to severe coughing was reduced significantly from 55% to 15%. They concluded that the nebulised Dexmedetomidine group has a higher protective effect for reducing cough with less haemodynamic changes.[31]

Another study was conducted by Zanaty and Metainy SA et al. in the year 2015 to evaluate and compare the efficacy and safety of nebulized Dexmedetomidine, nebulised Ketamine and combination of these drugs for premedication in pediatric outpatient dental surgeries. Sixty children were randomly categorized into 3 groups of 20 patients each. Patients in group K were premedicated with nebulized Ketamine (2 mg/kg), group D were premedicated with nebulised Dexmedetomidine (2 ug/kg) and group DK were premedicated with combined nebulised Dexmedetomidine and Ketamine (1ug/kg+1mg/kg). Group DK had the briefest recovery times, followed by group K and group D with progressively longer recovery times. Postoperative analgesia was significantly better in group DK compared with group K. Hence, they concluded that nebulised dexmedetomidine combined with other anaesthetic agents as a premedication for paediatric outpatients provides smoother induction of general anesthesia with shorter recovery period and minimal side effects.[32]

In year 2014 Piao G, Wu J performed a meta-analysis of randomized controlled trials to evaluate Dexmedetomidine as an anesthetic agent

given intravenously. According to their meta-analysis conducted on 18 studies they concluded that Dexmedetomidine can stabilize blood pressure and heart rate and prevent postoperative adverse reactions. However patients with original hypovolemia or heart block should be cautious. The incidence rates of postoperative nausea and vomiting, chills and shivering were lower than control group. However the occurrence rates of bradycardia and hypotension in Dexmedetomidine group were higher than control group.[33]

Jan Hau Lee, David A., Turner et al. in the year 2016 conducted a prospective multi-instititional pediatric observational study to study the impact of multiple tracheal intubation attempts on outcomes in critically ill children. They defined an “Attempt” as a single advanced airway maneuver, beginning with the insertion of device such as laryngoscope into patients mouth or nose and ending when device is removed.[34]

Combes X, Andriamifidy et al. in the year 2007, conducted a double blind study on 300 patients and concluded that post intubation symptoms like sore throat were more frequent in patients intubated without the use of a muscle relaxant.[35] Clayton Smith conducted a meta-analysis to compare the efficacy and adverse effects of double lumen endobronchial tubes and concluded that double lumen endobronchial tubes are associated with a greater risk of sore throat.[36] However, according to Seo JH, Kwon TK insertion of double lumen endobronchial facing anteriorly during passage through vocal cords reduces rate of POST by 50%.[37]

Neepa patel, Sandeep et al. in the year 2022, conducted Comparative evaluation of incidence of post operative sore throat after nebulization with Ketamine and magnesium sulfate in patients undergoing general anaesthesia requiring endotracheal intubation. 88 patients of ASA grading I-III, aged between 18-65 years undergoing general anaesthesia on elective basis were randomly divided into two groups. 44 patients received pre-operative nebulisation with 1ml ketamine(50mg) with 1ml normal saline while others received nebulization with 500mg magnesium sulfate with 1ml normal saline. Number of intubation attempts, duration of laryngoscopy and duration

of surgery were recorded. Patients were evaluated for post-operative sore throat, hoarseness of voice and cough at 0hr, 2hr, 4hr, 12hr, and 24hr in postoperative period. Incidence of post-operative sore throat, cough and hoarseness of voice was reduced statistically significantly with Ketamine nebulization when compared to magnesium sulphate nebulization.[38]

Singh V., Pahade A. and Mowar A. conducted a study on 20 ASA I & II adult patients undergoing elective surgeries requiring tracheal intubation, they were randomized to receive intravenous dexmedetomidine (1 µg/kg over 10 minutes) and nebulized dexmedetomidine (1 µg/kg in 3 - 4 mL of 0.9% saline), 30 min before anesthesia induction. Heart rate and non-invasive blood pressure were monitored for 10 min following laryngoscopy and then throughout the surgery. Intraoperative analgesic consumption, postoperative sore throat, and recovery from anesthesia were assessed. No significant hemodynamic difference was found between the two groups till three minutes. Then, the difference turned significant owing to a greater fall in the heart rate and mean arterial pressure in the intravenous group. Nebulized dexmedetomidine exhibited a lesser tendency of hypo/hypertension and brady/tachycardia, while hemodynamics was more stable. There was lesser sore throat and sedation in the nebulized group. Intraoperative analgesic and propofol consumption was comparable between the two groups.[39]

Misra S. et al. conducted randomized control trial to study the effect of preoperative dexmedetomidine nebulization on the haemodynamic response to laryngoscopy and intubation. They concluded that nebulized dexmedetomidine at 1 ug/ml attenuated increase in HR but not SBP following laryngoscopy and reduced intraoperative anesthetic and analgesic consumption. There was no effect on early PONV, sore throat or increase in incidence of adverse effects. Nebulized dexmedetomidine may represent a favourable alternative to the intravenous route in short duration surgeries.[40]

Sakae T. et al. conducted a study to evaluate role of topical airway anesthesia on immediate post extubation cough /bucking and

extubation time. They concluded that topical airway anesthesia was better than placebo or no medication in reducing immediate post extubation cough/ bucking.[41]

In the year 2022, NiuJ., Hu R conducted a prospective randomized double blinded controlled trial to study the effect of intratracheal dexmedetomidine combined with ropivacaine on postoperative sore throat. Two hundred patients with ASA I-II who were subjected to general anaesthesia were randomly divided into four groups namely, Group D, Group R, Group R, Group DR and Group S; these groups received intratracheal Dexmedetomidine (1 ug/kg), 0.8 % ropivacaine (40 mg), Dexmedetomidine (1 ug/kg) combined with 0.8% ropivacaine (40 mg) and normal saline before endotracheal intubation respectively. The incidence and severity of sore throat were significantly lower in Group DR than in the other three groups 2 h after the operation, but they were only significantly lower in group DR than in the control group 24 h after the operation. Also compared with group S and group D, group DR exhibited more stable hemodynamics during intubation. The doses of remifentanil and propofol were significantly lower in Group DR than in the other groups. The combined use of dexmedetomidine and ropivacaine for surface anaesthesia before intubation significantly reduced the incidence and severity of postoperative sore throat.[15]

In the year 2020, Kim H, MD et al. conducted a study on 74 patients who underwent thyroidectomy to see the effect of dexmedetomidine and remifentanil on the postoperative sore throat after thyroidectomy. Group D received intravenous dexmedetomidine 1 ug/kg over ten minutes, followed by continuous infusion at 0.3 to 0.6 ug/kg/hour during surgery. Group R received remifentanil of 3 to 4 ng /ml during induction followed by 1.5 to 2.5 ng/ml remifentanil infusion. POST incidence at rest and swallowing was lower in group D than in group R during 1 to 6 and 6 to 24 hours.[42]

Taken together, these studies suggest that preoperative nebulisation with Dexamethasone and Dexmedetomidine reduce both incidence and severity of postoperative sore throat. Hence we propose to evaluate the incidence and grade of sore throat, hoarseness, cough

and throat pain postoperatively in patients undergoing general anesthesia with endotracheal intubation after nebulisation with Dexamethasone, Dexmedetomidine and normal saline (control group).

MATERIALS AND METHODS

SOURCE OF DATA

A randomized, double blind clinical study was conducted in department of Anaesthesiology, Dayanand Medical College on a total of 150 patients ≥ 18years of age with ASA I –III scheduled for elective operative procedure under general anaesthesia with endotracheal intubation. The patients were randomly allocated to either of the 3 study groups of 50 patients each by computer generated randomisation codes contained in sealed, sequentially numbered envelopes.

METHOD OF COLLECTION OF DATA

Inclusion Criteria–

- ASA I, II and III patients with age group of ≥18 years undergoing surgery under general anaesthesia with endotracheal intubation.

Exclusion criteria –

- History of recent upper respiratory tract infection or sore throat
- Duration of surgery >3 hrs
- Mallampati grade >3
- Patients who need more than two intubation attempts
- Patient allergic to the drugs used in the study.

GROUP ALLOCATION:

150 patients were recruited for the study and divided into three groups of 50 patients each using computer generated random number list, using opaque sealed envelopes.

Group I Comprising of 50 patients, received nebulised Dexmedetomidine 50ug (0.5 ml) with 4.5 ml of normal saline (total volume =5ml)

Group II

Comprising of 50 patients received nebulized Dexamethasone 8mg (2ml) with 3 ml of normal saline(total volume =5ml).

Group III

Comprising of 50 patients received normal saline (total volume=5ml)

SAMPLE SIZE CALCULATION

By using previous studies [2][43], the incidence of POST is 26% with saline, 10% with Dexamethasone and 10.2% with Dexmedetomidine in nebulised form.

Based on this assumption

The formula used in the situation is as under:

$$n = \frac{[Z_{1-\alpha/2}\sqrt{2P(1-P)} + Z_{1-\beta}.\sqrt{\{P1(1-P1) + P2(1-P2)\}}]^2}{(P1-P2)^2}$$

Where P=(P1+P2)/2

- Approximate value of efficacy/cure rate for standard treatment =P1
- Approximate value of efficacy/cure rate for other treatment = P2
- Effect size = (P2-P1)
- Level of significance (usually 5%)

Zα = Value of standard normal variate corresponding to α level of significance (1.96)

Zβ = The standard normal deviate for desired power (1.282)

With the above assumptions the sample size for 95% confidence level and 90% power worked out 50 in each group.

BLINDING

The patients were allocated randomly using computer generated random number list which were arranged by a biostatistician using consecutively numbered opaque sealed envelopes. After opening the envelopes, the nebulisation solution was prepared according to the assigned group by the anaesthesiologist who did not take part in the subsequent analysis of these patients. The anaesthesiologist who nebulised the patient and monitored intraoperatively and in the postoperative period was unaware of the solution administered. Patients were also blinded as the three study preparations were colourless, tasteless and odourless.

PRE ANAESTHETIC CHECKUP

Routine thorough check up was conducted comprising of detailed history, comorbidities, allergy to any drug being used ,general physical and systemic examination. Patients were explained about the study and written consent was taken. Relevant investigations were sent and

reviewed. Fasting of 8 hours for solid food was advised to patients prior to surgery.

ANAESTHESIA TECHNIQUE

On the day of surgery patient was shifted to the operating room and standard monitors applied such as non-invasive blood pressure, pulse oximetery, electrocardiogram and capnography and baseline parameters recorded. Patient were positioned on operating table in supine position and intravenous access secured and intravenous crystalloids started. Baseline vitals were monitored. The drug prepared for nebulisation was then delivered by using a nebulisation mask for 10 minutes, with the help of a wall attached oxygen driven source at a flow rate of 5-6 litres/minute. Factors such as HR, SBP and DBP were recorded during nebulisation every 5 minutes till induction, every hour intraoperatively and in the post operative period till 24 hours. Fifteen minutes after nebulisation patient was premedicated with injection Fentanyl 2mcg/kg, Midazolam 0.02 mg/kg. After preoxygenation with a fresh gas flow of 10litres/min for 3 min and general anaesthesia was induced with intravenous Propofol 2mg/kg. Tracheal intubation was done by an experienced anaesthesiologist 3 minutes after administering injection Atracurium 0.5 mg/kg intravenously. An appropriate sized sterile single lumen cuffed endotracheal tube was introduced using stylet and any manipulation required was done when needed. The cuff of the endotracheal tube was inflated with air, till no audible air leak was detected just to obtain a seal. Cuff pressure was monitored using a hand gripped cuff pressure manometer and monitoring was done every hour to maintain cuff pressure of 25 cm of water till the end of surgery. General anaesthesia was maintained using oxygen and nitrous oxide with inhalational agent . At the end of surgery oropharynx was gently suctioned and neuromuscular block was reversed using injection neostigmine 0.05mg/kg and injection glycopyrrolate 0.01 mg/kg. Tracheal extubation was performed and after extubation patients were shifted to postoperative care unit for observation. Patients were monitored for any other side effects.

OBSERVATION:

Patients were assessed in the postoperative ward by an anaesthesiologist blinded for the study. Intensity of sore throat, cough ,hoarseness and pain were assessed at 0 hr, 1 hr, 2 hr, 4 hr, 8 hr, 12 hr, 24 hr postoperatively. The severity of POST was graded on a 4point scale (0-3) assessed as per following clinical scores -

GRADE	**SORE THROAT**
0	NO SORE THROAT
1	MINIMAL SORE THROAT (Complains of sore throat only on asking)
2	MODERATE SORE THROAT (Complains of sore throat on his/her own)
3	SEVERE SORE THROAT

GRADE	**COUGH**
0	NO COUGH
1	MINIMAL COUGH
2	MODERATE COUGH
3	SEVERE COUGH

GRADE	**HOARSENESS**
0	NO HOARSENESS
1	HOARSENESS AT TIME OF INTERVIEW BUT NOTED ONLY BY PATIENT
2	HOARSENESS THAT IS READILY APPARENT BUT MILD
3	HOARSENESS THAT IS READILY APPARENT AND SEVERE

Grade	**PAIN ACCORDING TO NUMERIC PAIN RATING SCALE**
0	NO PAIN
1	MILD PAIN (1-3)
2	MODERATE (4-6)
3	SEVERE (7-10)

The patients were then examined to determine the occurrence of any other postoperative complications and findings were recorded.

Study design: Prospective

Duration of study: 2 Years

Place of study: Inpatients in Department of Anaesthesiology in teaching hospital attached to Dayanand Medical College & Hospital, Ludhiana.

Statistical analysis: Data was described in terms of range; mean ±standard deviation (± SD), frequencies (number of cases) and relative frequencies (percentages) as appropriate. Comparison of quantitative variables between the study groups was done using ANOVA with post hoc tukey‘s test. For comparing categorical data, Chi square ($\chi 2$) test was performed and fisher exact test was used when the expected frequency is less than 5. A probability value (p value) less than 0.05 was considered statistically significant. All statistical calculations were done using (Statistical Package for the Social Science) SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows.

OUTCOME

To compare the effectiveness of nebulized Dexmedetomidine and Dexamethasone with normal saline in preventing Post Operative Sore Throat following endotracheal intubation.

DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.

NO

HAS ETHICAL CLEARANCE BEEN OBTAINED FROM YOUR INSTITUTION? YES

OBSERVATIONS AND RESULTS

The present randomized control study was conducted in a prospective manner in the department of Anesthesiology, DMCH Ludhiana on a total of 150 patients scheduled for elective procedures under general anaesthesia with endotracheal intubation belonging to ASA grade I, II& III.

The study aimed to compare the nebulized dexmedetomidine and dexamethasone in preventing sore throat following endotracheal intubation.

Figure 1: CONSORT Flow Diagram of the study

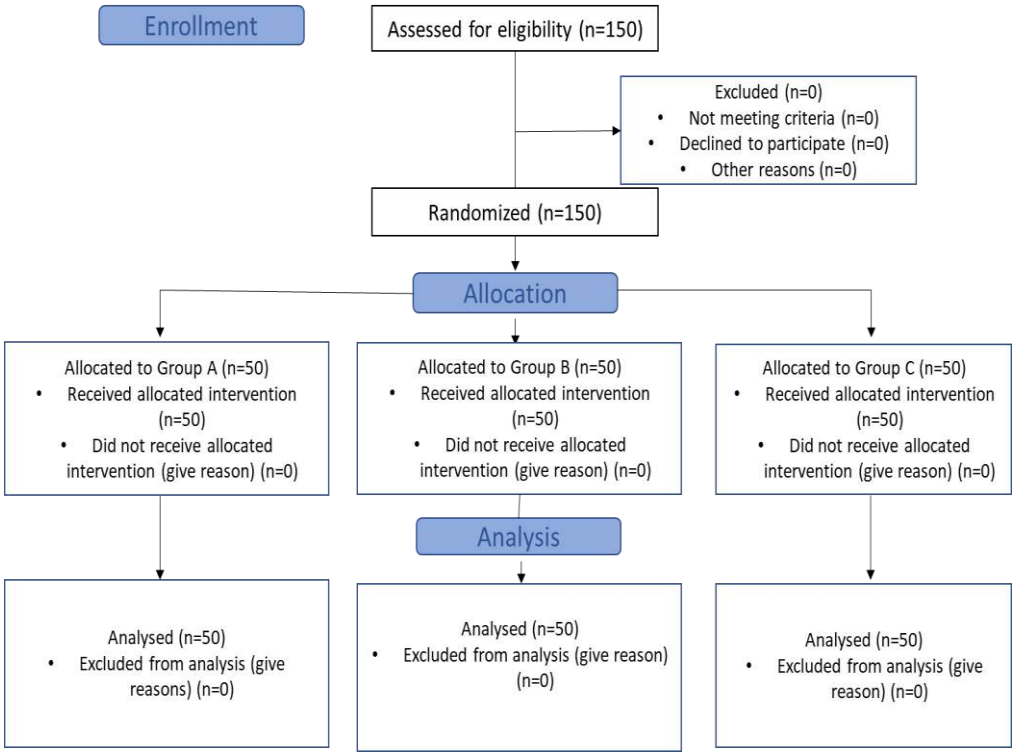
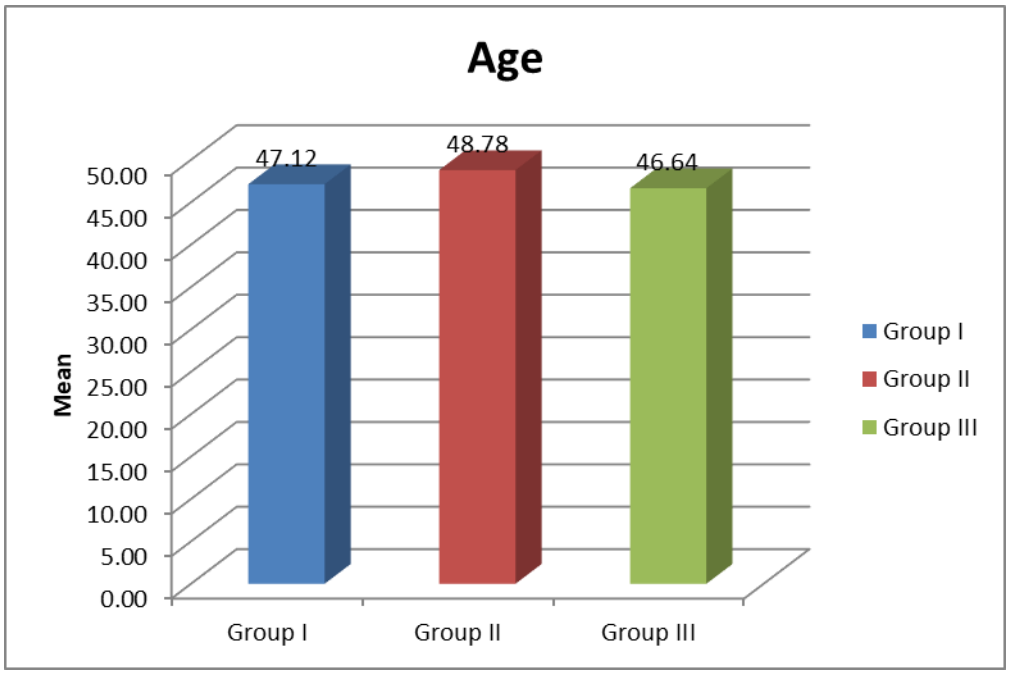

Enrollment
Assessed for eligibility (n=150)
Excluded (n=0)
• Not meeting criteria (n=0)
• Declined to participate (n=0)
• Other reasons (n=0)
Randomized (n=150)
Allocation
Allocated to Group A (n=50)
• Received allocated intervention (n=50)
• Did not receive allocated intervention (give reason) (n=0)
Allocated to Group B (n=50)
• Received allocated intervention (n=50)
• Did not receive allocated intervention (give reason) (n=0)
Allocated to Group C (n=50)
• Received allocated intervention (n=50)
• Did not receive allocated intervention (give reason) (n=0)
Analysis
Analysed (n=50)
• Excluded from analysis (give reasons) (n=0)
Analysed (n=50)
• Excluded from analysis (give reason) (n=0)
Analysed (n=50)
• Excluded from analysis (give reason) (n=0)

Table 1: Distribution of patients according to age (years)

	Group I		Group II		Group III		t	P value
	Mean	SD	Mean	SD	Mean	SD		
Age (years)	47.12	14.59	48.78	18.06	46.64	16.28	0.235	0.791

Figure 2- Distribution of patients according to age

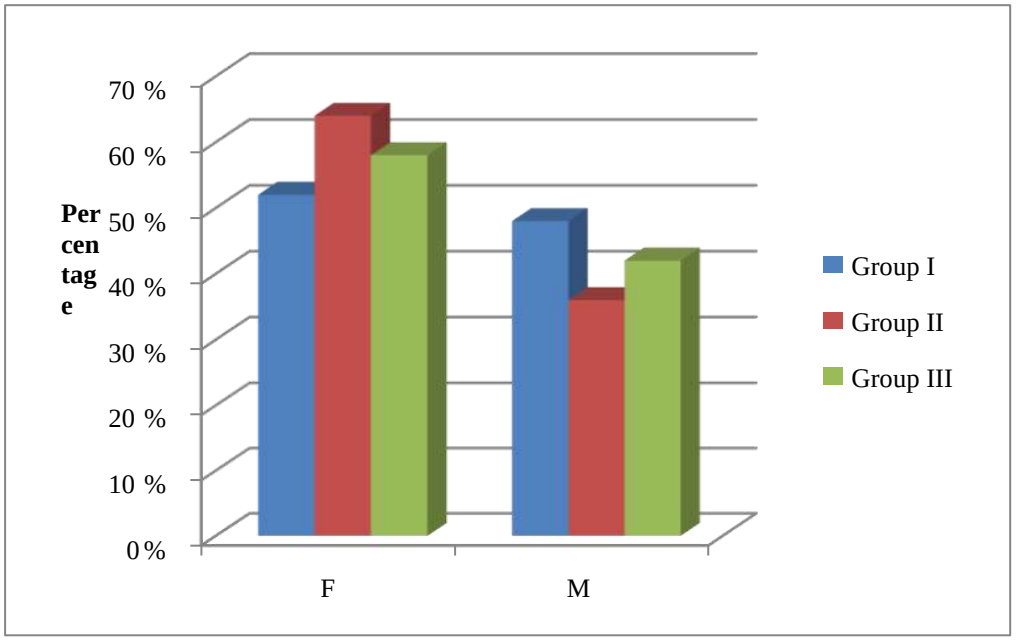


The groups were comparable with respect to age, mean age in group I was 47.12, 48.78 in group II and 46.64 in group III.

TABLE 2: Distribution of patients according to gender

		Group I		Group II		Group III		Total	Chi square	P value
		No. of cases	%	No.of cases	%	No.of cases	%			
Gender	Female	26	52%	32	64%	29	58%	87	1.478	0.478
	Male	24	48%	18	36%	21	42%	63		
Total		50	100%	50	100%	50	100%	150		

Figure 3 –Distribution of patients according to gender

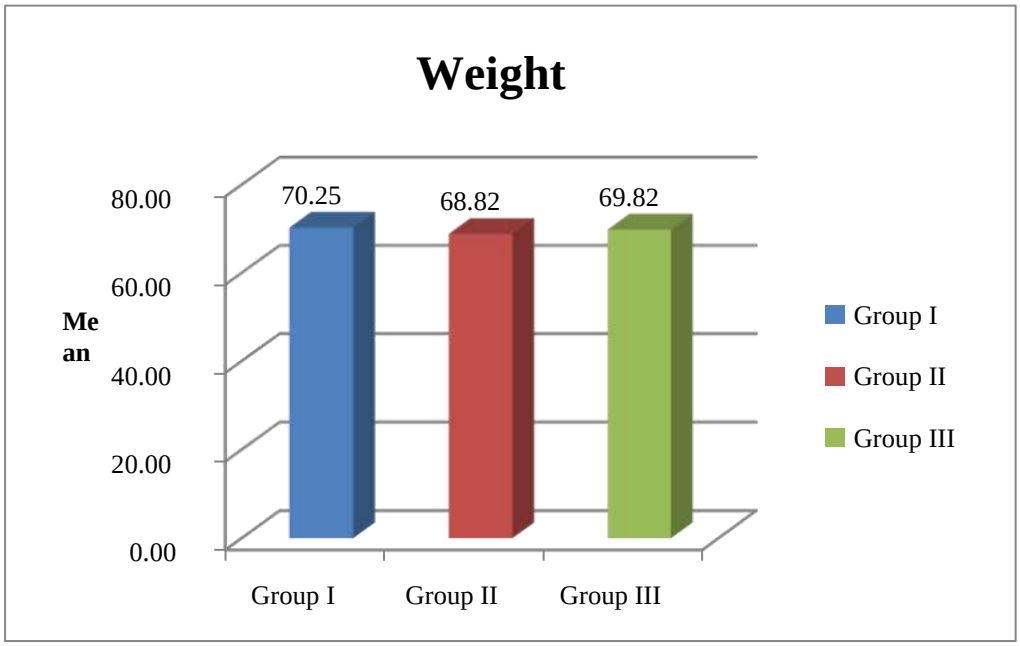


The three groups were comparable with respect to gender, however there were more of female patients as compared to male in all the three groups. In group I there were 52 % females and 48 % males, in group II there were 64 % females and 36 % males, in group III, there were 58 % females and 42 % males.

Table 3-Distribution of patients according to weight

	Group I		Group II		Group III		F	p-value
	Mean	SD	Mean	SD	Mean	SD		
Weight	70.25	18.12	68.82	12.36	69.82	17.37	0.103	0.902

Figure 4- Distribution of patients according to weight



The three groups were comparable with respect to weight, mean weight was 70.25 in group I, 68.82 in group II and 69.82 in group III

Table 4 – Distribution of patients according to Mallampati grading

		Group I		Group II		Group III		Total	Chi square value	P value
		No. of cases	%age	No of cases	%age	No of cases	%age			
Mallampati grade	I	7	14%	8	16%	14	28%	29	4.755	0.313
	II	18	36%	22	44%	18	36%	58		
	III	25	50%	20	40%	18	36%	63		
Total		50	100%	50	100%	50	100%	150		

Figure 5- Distribution of patients according to Mallampati grading in three groups

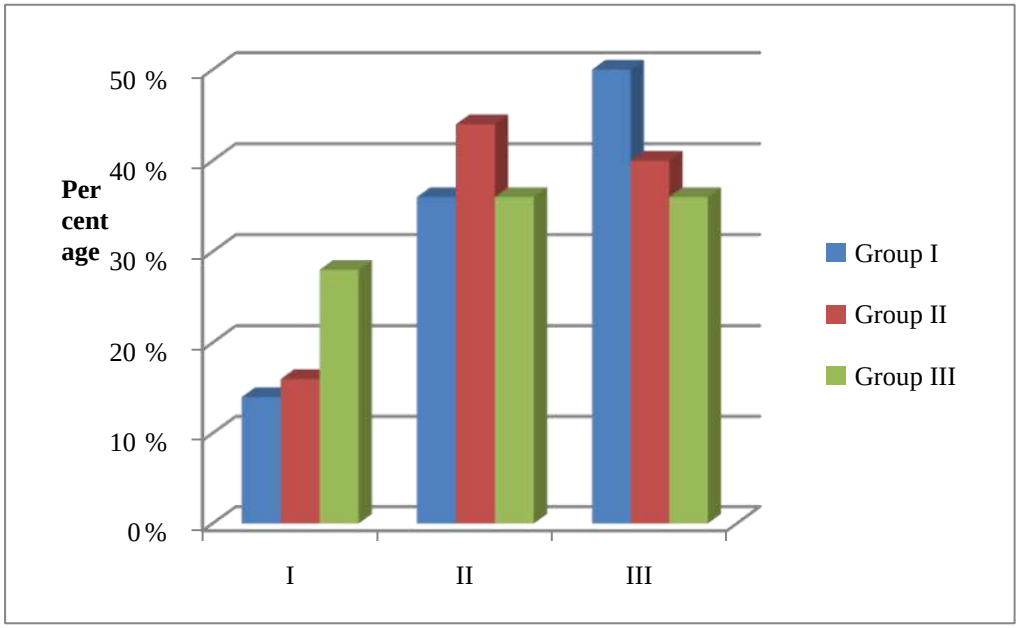
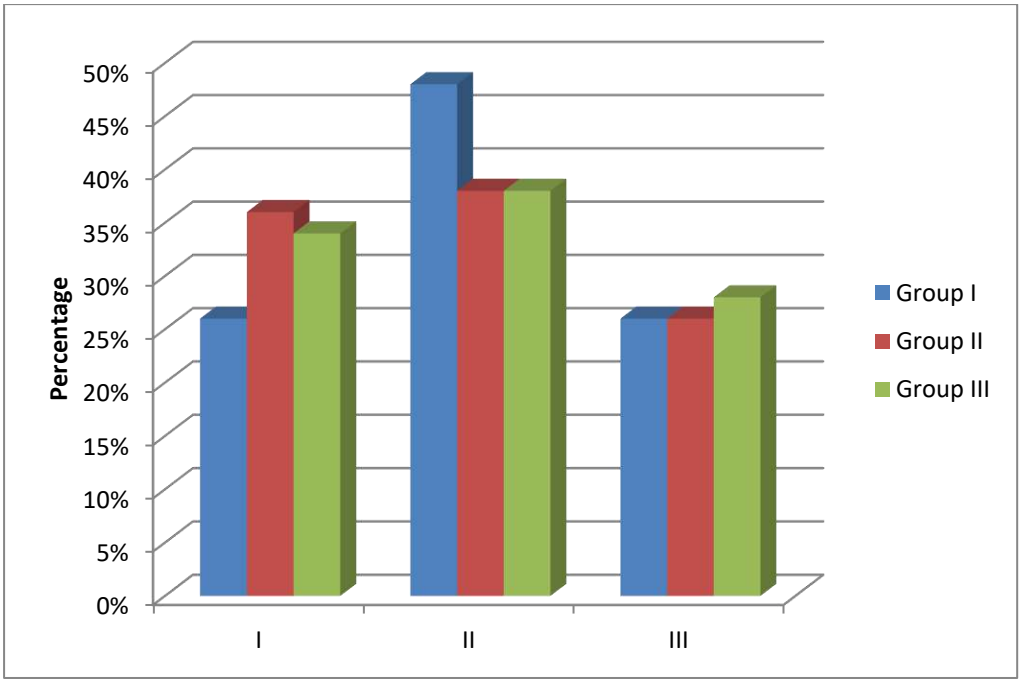


Table 5: Distribution of patients according to ASA grading

		Group I		Group II		Group III		Total	Chi Square value	P value+3
		No. of cases	%age	No. of cases	%age	No. of cases	%age			
ASA	I	13	26%	18	36%	17	34%	48	1.731	0.785
	II	24	48%	19	38%	19	38%	62		
	III	13	26%	13	26%	14	28%	40		
Total		50	100%	50	100%	50	100%	150		

Figure 6 – Distribution of patients in 3 groups according to ASA grading

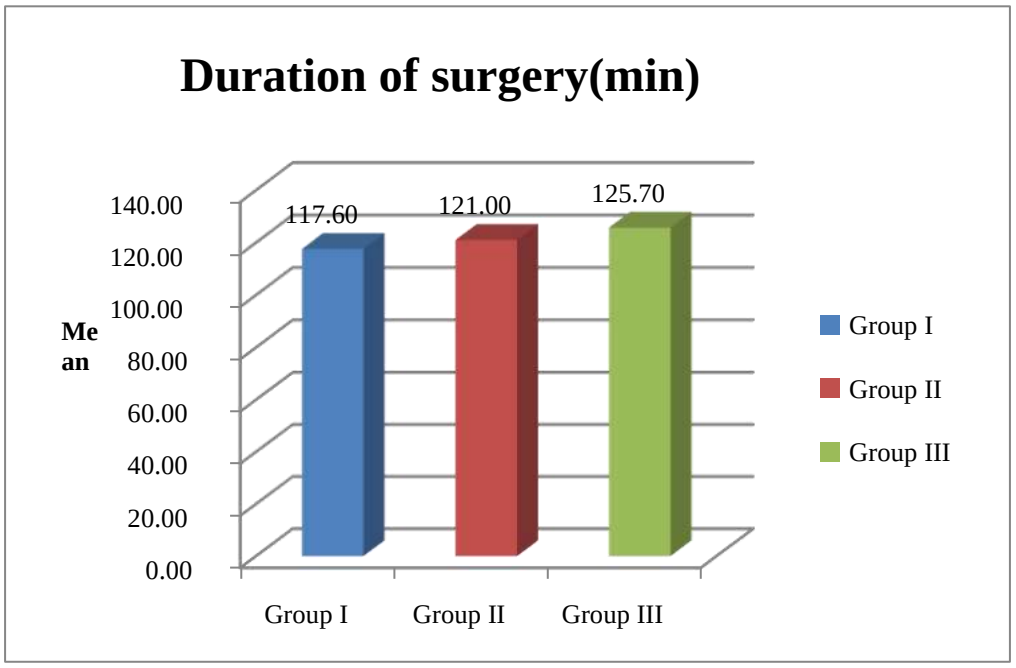


The three groups are comparable with respect to Mallampati grading and ASA grading. 25 patients had MPS grade III in Group I, 20 patients in Group II, while 18 patients had MPS III in Group III. This difference is however not statistically significant.

Table 6- Distribution of duration of surgery in three groups

	Group I		Group II		Group III		T	P value
	Mean	SD	Mean	SD	Mean	SD		
Duration of surgery	117.60	35.29	121	39.68	125.70	39.03	0.571	0.566

Figure 7- Distribution of duration of surgery in group I, II and III

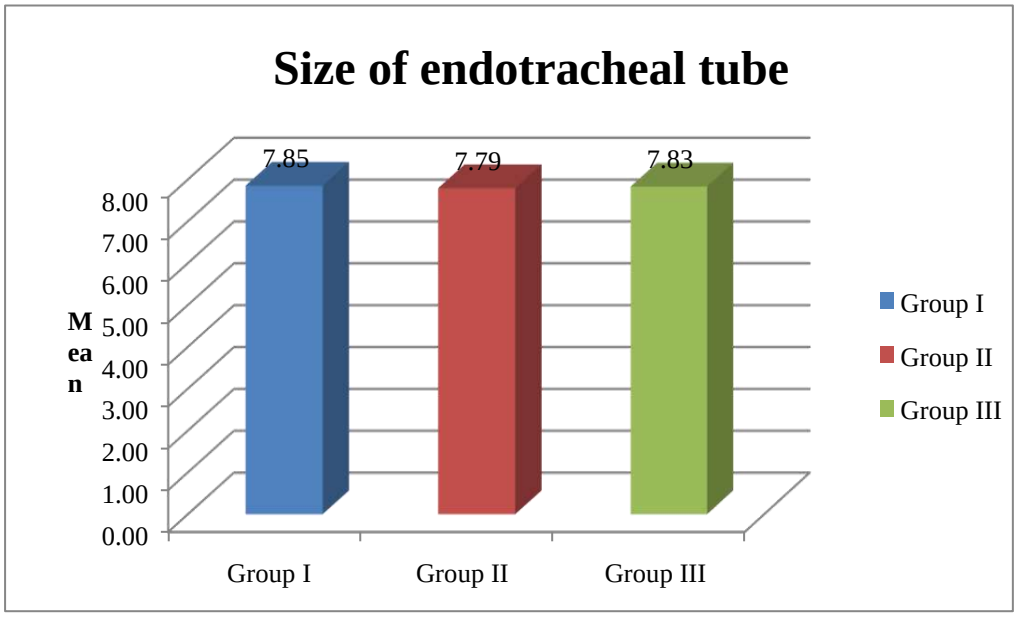


Duration of surgery (min) was comparable in the three groups, having mean of 117.60 in group I,121 in group II and 125.70 in group III.

Table 7: Comparison of endotracheal tubes in three groups

	Group I		Group II		Group III		F	p-value
	Mean	SD	Mean	SD	Mean	SD		
Size of endotracheal tube	7.85	0.47	7.79	0.49	7.83	0.61	0.169	0.844

Figure 8: Comparison of size of endotracheal tubes (ID in mm) in three groups

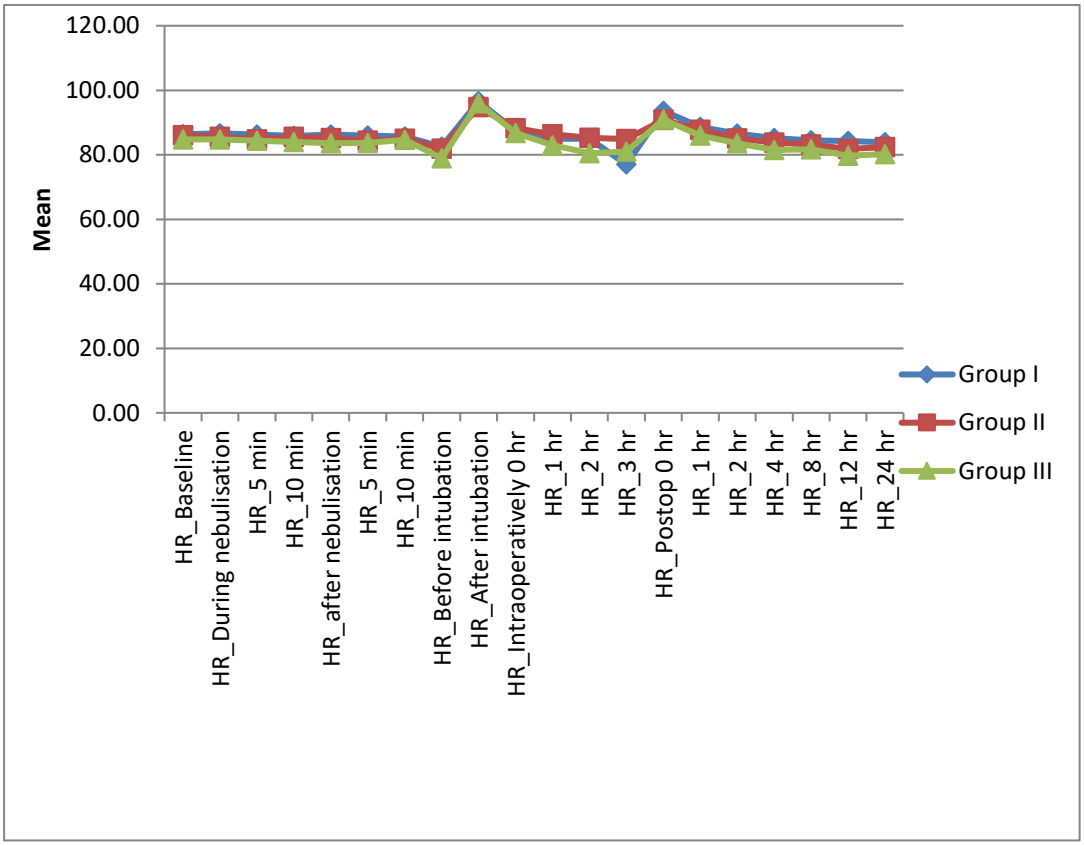


Age appropriate size of endotracheal tubes were used, there was no significant difference in the tube sizes used in three groups.

Table 8: Distribution of heart rate in three groups before nebulization (0 hr) during nebulisation (0 min, 5 min, 10 min) after nebulisation and at 1hr ,2 hr,3hr intraoperatively and postoperatively at 0 hr, 1 hr, 2 hr, 4 hr, 8 hr , 12 hr, 24 hr

	Group I		Group II		Group III		F	p-value
	Mean	SD	Mean	SD	Mean	SD		
HR_Before nebulisation 0 hr	86.34	14.50	86.06	15.30	84.74	16.88	0.150	0.861
HR_During nebulisation	86.70	14.13	85.60	14.95	84.72	16.45	0.213	0.809
HR_5 min	86.26	13.57	84.80	14.58	84.42	16.68	0.210	0.811
HR_10 min	85.82	14.13	85.60	14.35	83.98	16.77	0.221	0.802
HR_after nebulisation	86.24	13.23	85.12	13.94	83.60	16.07	0.420	0.658
HR_5 min	85.92	13.76	84.38	14.80	83.68	15.99	0.297	0.744
HR_10 min	85.70	13.50	84.92	14.53	84.62			
HR_15 min (Before intubation)	82.52	15.44	81.92	11.97	78.94	15.91	0.869	0.422
HR_After intubation	96.54	15.51	94.78	14.79	96.02	14.26	0.185	0.831
HR_Intraoperatively 0 hr	87.40	14.47	88.22	17.42	86.74	16.71	0.104	0.901
HR_1 hr	84.96	13.93	86.38	14.59	82.96	15.32	0.690	0.503
HR_2 hr	84.94	12.70	85.27	13.70	80.47	14.37	1.298	0.278
HR_3 hr	77.00	8.46	84.89	14.60	81.00	9.26	0.896	0.422
HR_Postop 0 hr	93.63	16.96	90.86	14.07	90.92	17.44	0.470	0.626
HR_1 hr	88.68	14.74	87.72	12.56	85.98	15.30	0.461	0.631
HR_2 hr	86.60	14.11	85.08	11.49	83.60	13.71	0.651	0.523
HR_4 hr	85.12	14.65	83.80	10.70	81.54	12.81	0.997	0.371
HR_8 hr	84.46	13.55	83.22	10.65	81.72	13.35	0.594	0.553
HR_12 hr	84.24	13.07	81.82	11.26	79.72	13.88	1.565	0.213
HR_24 hr	83.88	12.91	82.42	10.52	80.22	12.95	1.144	0.321

Figure 9: Distribution of heart rate in three groups before nebulisation,during nebulisation(5min), after nebulisation and at 1hr ,2 hr,3hr intropera tively and postoperatively at 0 hr, 1 hr, 2 hr, 4 hr, 8 hr , 12 hr, 24 hr

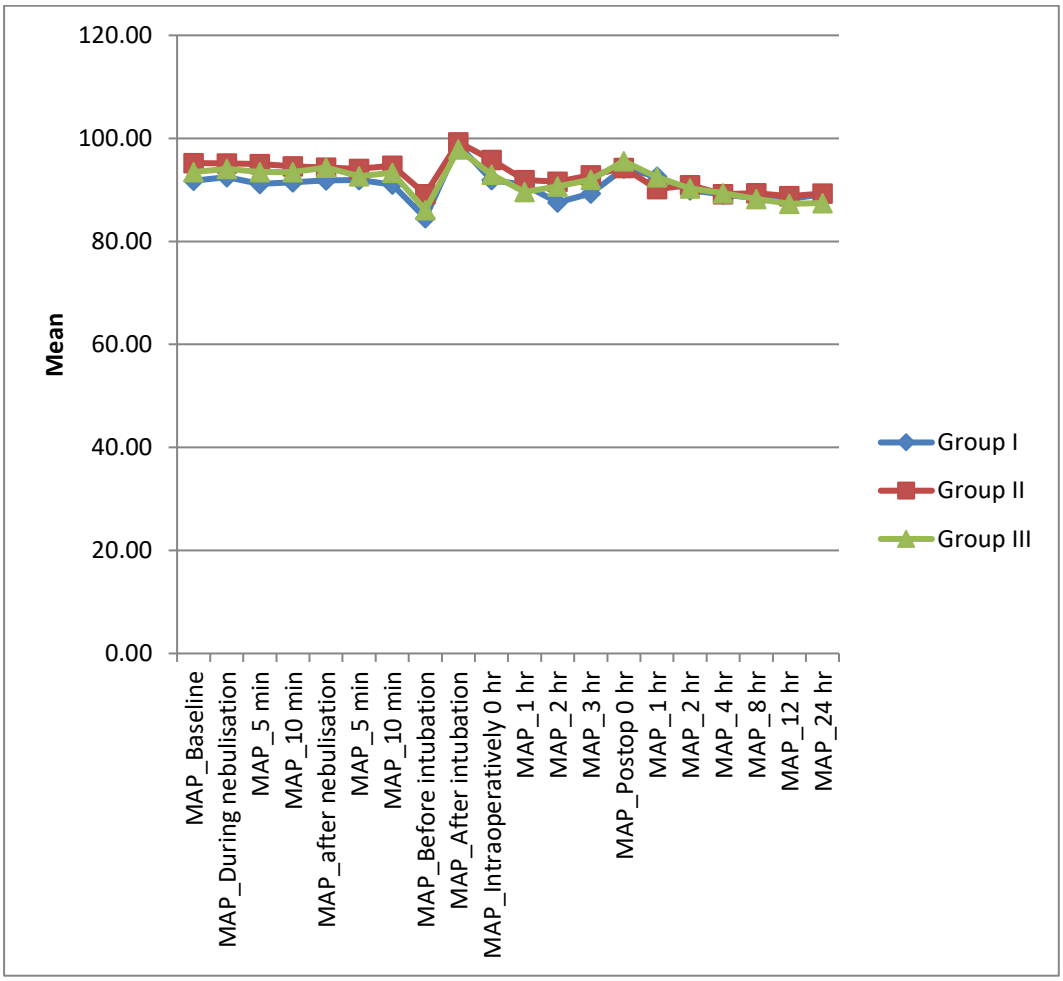


Heart rate was comparable in three groups at 0 hr, 1hr, 2 hr, 4 hr,8 hr,12hr, 24hr.

Table 9: Distribution of MAP in three groups, before nebulisation (0 hr) during nebulisation, after nebulisation, intraoperatively 0 hr, 1hr, 2hr,3 hr and postoperatively at 0 hr, 1 hr , 2 hr, 4 hr, 8 hr, 12 hr, 24 hr

	Group I		Group II		Group III		F	p-value
	Mean	SD	Mean	SD	Mean	SD		
MAP_ Before nebulisation 0 hr	91.80	12.34	95.20	11.10	93.48	10.35	1.133	0.325
MAP_During nebulisation	92.46	11.36	95.12	11.30	94.10	9.47	0.780	0.460
MAP_5 min	91.14	11.15	95.02	11.33	93.44	9.29	1.685	0.189
MAP_10 min	91.46	10.57	94.60	10.20	93.44	8.55	1.309	0.273
MAP_after nebulisation	91.84	10.82	94.36	11.22	94.36	7.78	1.046	0.354
MAP_5 min	91.88	10.52	94.10	10.29	92.66	7.60	0.694	0.501
MAP_10 min	91.04	10.70	94.68	10.70	93.36	8.31	1.709	0.185
MAP_Before intubation	84.52	11.43	89.18	10.96	86.08	9.20	2.517	0.084
MAP_After intubation	98.74	11.64	99.26	13.94	97.88	12.58	0.149	0.861
MAP_Intraoperatively 0 hr	91.92	12.93	95.82	12.02	92.96	9.39	1.530	0.220
MAP_1 hr	90.98	10.08	91.88	10.42	89.58	9.32	0.678	0.509
MAP_2 hr	87.56	8.67	91.61	8.47	90.68	6.91	2.248	0.111
MAP_3 hr	89.29	6.87	92.82	8.07	92.00	8.59	0.431	0.654
MAP_Postop 0 hr	94.16	10.74	94.29	12.02	95.58	12.88	0.217	0.805
MAP_1 hr	92.60	11.14	90.16	12.92	92.48	10.45	0.709	0.494
MAP_2 hr	89.94	10.87	90.90	9.90	90.32	8.16	0.124	0.883
MAP_4 hr	89.12	11.08	89.16	11.71	89.34	9.40	0.006	0.994
MAP_8 hr	88.34	9.36	89.38	11.52	88.22	9.02	0.202	0.817
MAP_12 hr	88.22	10.04	88.78	9.18	87.30	8.31	0.330	0.720
MAP_24 hr	89.12	11.47	89.32	8.95	87.46	7.15	0.595	0.553

Figure 10: Distribution of MAP in three groups ,during nebulisation, after nebulisation, intraoperatively 0hr, 1hr, 2hr, 3 hr and postoperatively at 0 hr, 1 hr , 2 hr, 4 hr, 8 hr, 12 hr, 24 hr.

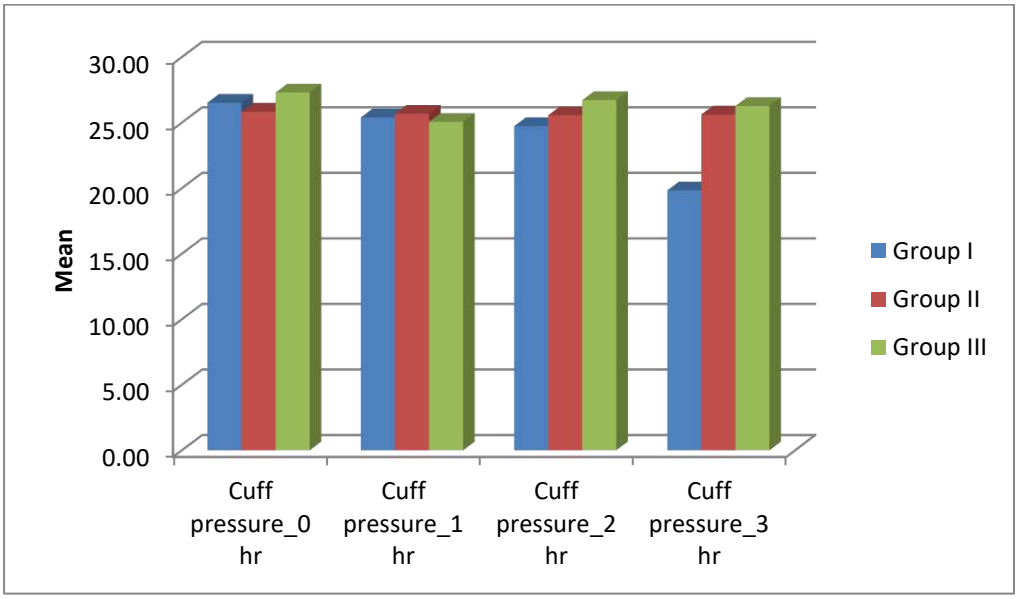


There was no significant difference in MAP in three groups at 0 hr, 1 hr, 4 hr,8 hr, 12 hr, 24 hr.

Table 10: variations in cuff pressure in three groups at 0 hr, 1 hr, 2 hr and 3 hr.

	Group I		Group II		Group III		F	p-value
	Mean	SD	Mean	SD	Mean	SD		
Cuff pressure_0 hr	26.52	3.98	25.84	3.32	27.30	3.81	1.935	0.148
Cuff pressure_1 hr	25.40	3.49	25.68	4.24	25.06	3.81	0.324	0.724
Cuff pressure_2 hr	24.73	4.07	25.56	3.30	26.73	4.32	2.064	0.133
Cuff pressure_3 hr	19.83	10.01	25.63	2.92	26.27	3.69	2.768	0.085

Figure 11 – Variations in cuff pressure in group I, II AND III at 0 hr, 1 hr, 2 hr and 3 hr intraoperatively

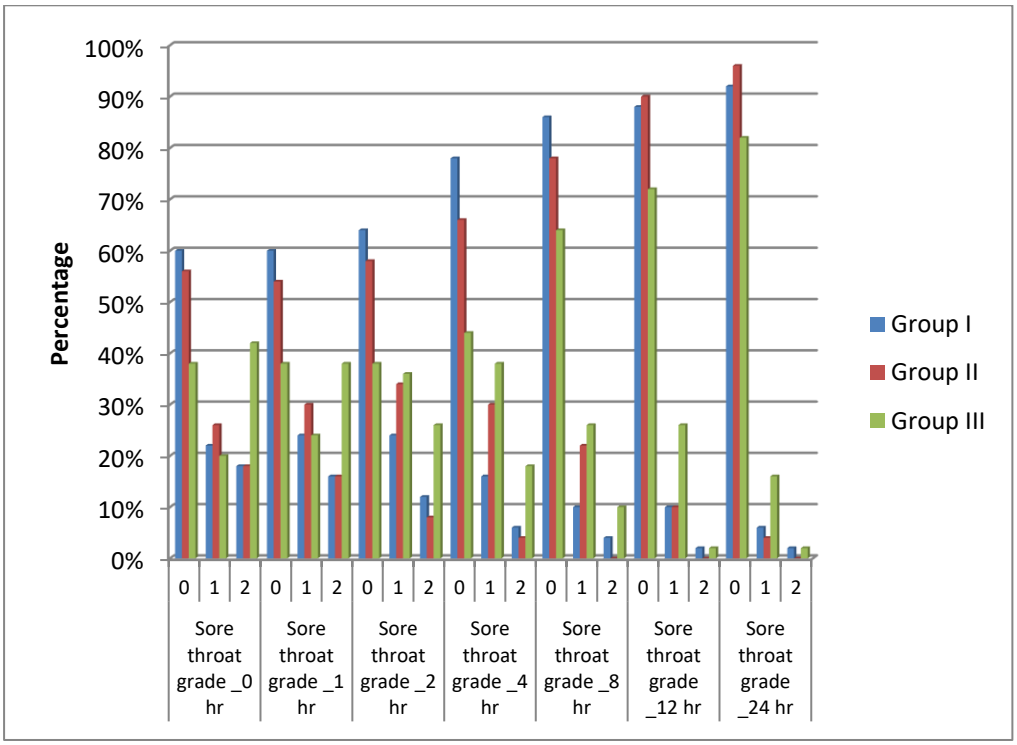


No significant difference was noted in cuff pressure in three groups at 0 hr, 1hr, 2hr and 3 hr. The cuff pressures were monitored hourly and reduced to 25 cm of H_2O when found to be increased.

Table 11: Sore throat grading at 0hr ,1 hr, 2 hr, 4 hr, 8 hr, 12 hr and 24 hr postoperatively

		Group I		Group II		Group III		Total	Chisquare value	p-value
		No. of cases	%age	No. of cases	%age	No. of cases	%age			
Sore throat grade _0 hr	0	30	60%	28	56%	19	38%	77	10.472	0.033
	1	11	22%	13	26%	10	20%	34		
	2	9	18%	9	18%	21	42%	39		
Sore throat grade _1 hr	0	30	60%	27	54%	19	38%	76	9.928	0.042
	1	12	24%	15	30%	12	24%	39		
	2	8	16%	8	16%	19	38%	35		
Sore throat grade _2 hr	0	32	64%	29	58%	19	38%	80	10.620	0.031
	1	12	24%	17	34%	18	36%	47		
	2	6	12%	4	8%	13	26%	23		
Sore throat grade _4 hr	0	39	78%	33	66%	22	44%	94	15.316	0.004
	1	8	16%	15	30%	19	38%	42		
	2	3	6%	2	4%	9	18%	14		
	0	43	86%	39	78%	32	64%	114	10.646	0.031
Sore throat grade _8 hr	1	5	10%	11	22%	13	26%	29		
	2	2	4%	0	0%	5	10%	7		
Sore throat grade _12 hr	0	44	88%	45	90%	36	72%	125	7.733	0.102
	1	5	10%	5	10%	13	26%	23		
	2	1	2%	0	0%	1	2%	2		
Sore throat grade _24 hr	0	46	92%	48	96%	41	82%	135	6.347	0.175
	1	3	6%	2	4%	8	16%	13		
	2	1	2%	0	0%	1	2%	2		
Total		50	100%	50	100%	50	100%	150		

Figure 12: Grading of sore throat from 0 hr to 24 hr in three groups

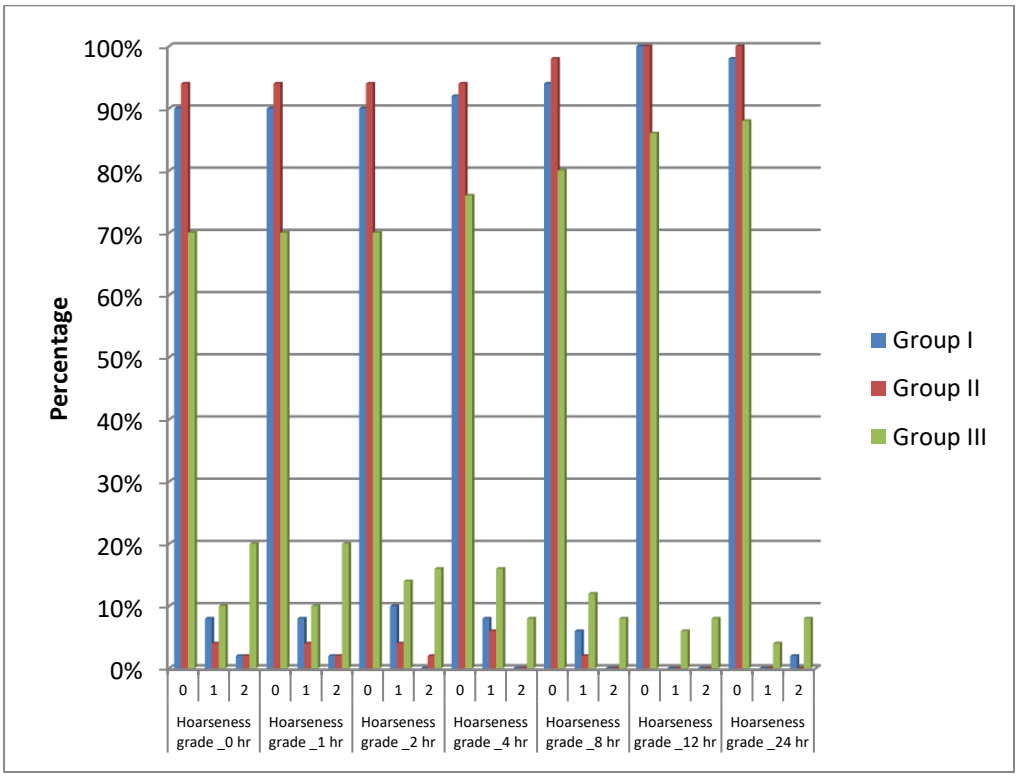


Incidence of sore throat was highest in group III, significant difference (p value <0.05) was noted from group I and group II at 0 hr, 1 hr, 2 hr, 4 hr and 8 hr. The incidence of sore throat in group I and group II were comparable to each other statistically. At 4 hour, grade 2 sore throat was noted in 9 patients in group III,3 patients in group I and 2 patients in group II. At 24 hr , 4 patients had sore throat in Group I , 2 patients in Group II and 9 patients in Group III . At 24 hr ,1 patient had Grade 2 sore throat in Group I and 1 patient in group III, no patient experienced grade 2 sore throat in Group II. Group III had higher incidence of POST even at 24 hr.

Table 12: Grading of hoarseness at different time postoperatively in three groups till 24 hours

		Group						Total	Chisquare value	p-value
		1		2		3				
Hoarseness grade _0 hr	0	45	90%	47	94%	35	70%	127	16.725	0.002
	1	4	8%	2	4%	5	10%	11		
	2	1	2%	1	2%	10	20%	12		
Hoarseness grade _1 hr	0	45	90%	47	94%	35	70%	127	16.725	0.002
	1	4	8%	2	4%	5	10%	11		
	2	1	2%	1	2%	10	20%	12		
Hoarseness grade _2 hr	0	45	90%	47	94%	35	70%	127	17.334	0.002
	1	5	10%	2	4%	7	14%	14		
	2	0	0%	1	2%	8	16%	9		
Hoarseness grade _4 hr	0	46	92%	47	94%	38	76%	131	11.915	0.018
	1	4	8%	3	6%	8	16%	15		
	2	0	0%	0	0%	4	8%	4		
Hoarseness grade _8 hr	0	47	94%	49	98%	40	80%	136	12.785	0.012
	1	3	6%	1	2%	6	12%	10		
	2	0	0%	0	0%	4	8%	4		
Hoarseness grade _12 hr	0	50	100%	50	100%	43	86%	143	14.685	0.005
	1	0	0%	0	0%	3	6%	3		
	2	0	0%	0	0%	4	8%	4		
Hoarseness grade _24 hr	0	49	98%	50	100%	44	88%	142	9.855	0.043
	1	0	0%	0	0%	2	4%	2		
	2	1	2%	0	0%	4	8%	5		
Total		50	100%	50	100%	50	100%	150		

Figure 13: Grading of hoarseness at 0, 1, 2, 4, 8, 12 and 24 hour

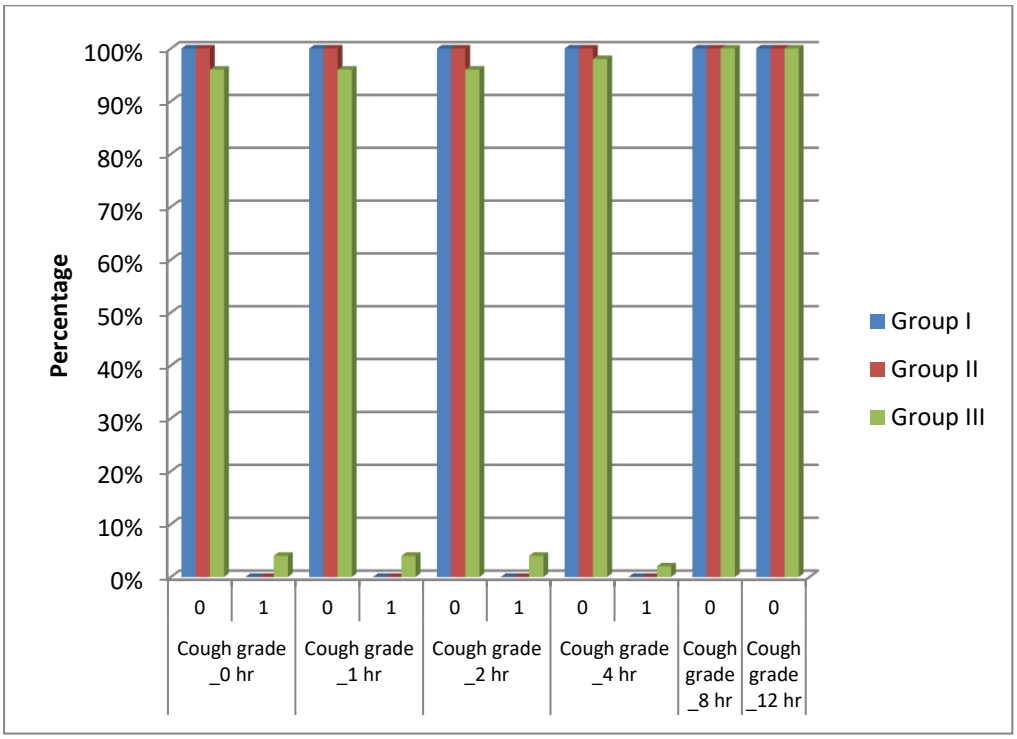


Incidence of hoarseness was highest in group III, significant difference was noted from group I and group II at 0 hr,1 hr, 2 hr, 4 hr, 8 hr, 12 hr, 24 hr. While incidence of hoarseness in group I and group II were comparable. At 4 hour, hoarseness was noted in 12 patients in group III,4 patients in group I and 3 patients in group II. No patient experienced grade 2 hoarseness in group I and group II.

Table 13: Cough grading in three groups at 0 hr, 1 hr, 2 hr, 4 hr, 8 hr, 12 hr and 24 hr

		Group I		Group II		Group III		Total	Chisquare value	p-value
		No. of cases	%age	No. of cases	%age	No. of cases	%age			
Cough grade _0 hr	0	50	100%	50	100%	48	96%	148	4.054	0.132
	1	0	0%	0	0%	2	4%	2		
Cough grade _1 hr	0	50	100%	50	100%	48	96%	148	4.054	0.132
	1	0	0%	0	0%	2	4%	2		
Cough grade _2 hr	0	50	100%	50	100%	48	96%	148	4.054	0.132
	1	0	0%	0	0%	2	4%	2		
Cough grade _4 hr	0	50	100%	50	100%	49	98%	149	2.013	0.365
	1	0	0%	0	0%	1	2%	1		
Cough grade _8 hr	0	50	100%	50	100%	50	100%	150		
Cough grade _12 hr	0	50	100%	50	100%	50	100%	150		
Cough grade _24 hr	0	50	100%	50	100%	50	100%	150		

Figure 14: Grading of cough at 0 hr, 1 hr, 2 hr, 4 hr, 8 hr, 12 hr, 24 hr

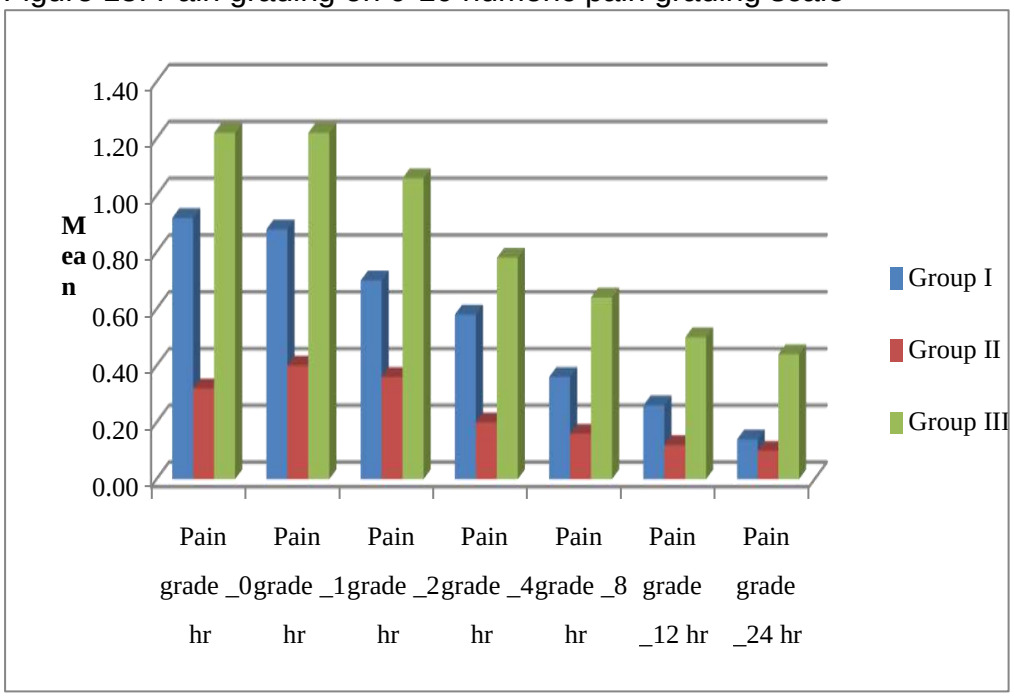


No significant difference was seen in the incidence of cough in three groups. Grade 1 Cough was noted in 2 patients in group III at 0hr,1hr,2hr while at 4 hr only one patient had grade 1 cough in Group III and no cough was observed in group I and II till 24 hr.

Table 14: Pain scoring from 1 to 10 on numerical pain scale at 0 hr, 1 hr, 2 hr, 4 hr, 8 hr, 12 hr and 24 hr

	Group I		Group II		Group III		F	p-value	I VS II	I VS III	II VS III
	Mean	SD	Mean	SD	Mean	SD			p-value	p-value	p-value
Pain grade _0 hr	0.92	1.61	0.32	1.08	1.22	1.87	4.346	0.015	0.056	0.336	0.004
Pain grade _1 hr	0.88	1.53	0.40	1.20	1.22	1.87	3.506	0.033	0.125	0.276	0.009
Pain grade _2 hr	0.70	1.28	0.36	1.10	1.06	1.71	3.184	0.044	0.222	0.196	0.013
Pain grade _4 hr	0.58	1.13	0.20	0.61	0.78	1.43	3.529	0.032	0.089	0.369	0.010
Pain grade _8 hr	0.36	0.72	0.16	0.51	0.64	1.21	3.893	0.023	0.249	0.107	0.006
Pain grade _12 hr	0.26	0.56	0.12	0.39	0.50	1.04	3.600	0.030	0.330	0.096	0.009
Pain grade _24 hr	0.14	0.35	0.10	0.30	0.44	0.88	5.197	0.007	0.729	0.010	0.004

Figure 15: Pain grading on 0-10 numeric pain grading scale



Significant difference was seen between group II and group III, group II having low grades in throat pain. However group I and II were comparable at different time periods postoperatively. At 4th hour, pain was maximum in group III and minimum in group I.

DISCUSSION

Post operative sore throat (POST) has high incidence in patients undergoing general anaesthesia with endotracheal intubation. POST increases hospital stay and increases patient dissatisfaction in postoperative period.[1-3]Factors such as tracheal tube size, cuff pressure and expertise of anaesthesiologist intubating the patient, all affect the incidence of POST.[10] Pharmacological interventions including use of nebulised local anesthetics, corticosteroids, magnesium sulphate and ketamine have shown to reduce the POST incidence as sought by various studies.[12-13] Nebulised Dexamethasone reduces both incidence and severity of POST.[4,14] Studies are being done to recognise non steroidal newer agents with minimal side effects .Dexmedetomidine causes reduction in levels of inflammatory mediators perioperatively, in view of these effects many authors advocate its preemptive administration in reducing the incidence of POST.[17-20]

The purpose of this prospective randomized study was to compare the effect of nebulised Dexmedetomidine and Dexamethasone on incidence and severity of post operative sore throat in 150 ASA I, II and III patients scheduled to undergo general anesthesia. Patients were randomly allocated to three study groups (Group I , II and Group III) based on computer generated random numbers. Nebulised Dexmedetomidine was given in Group I , nebulised Dexamethasone in Group II and normal saline in Group III , 15 minutes prior to induction of general anesthesia . Patients were assessed in the postoperative ward by an anaesthesiologist blinded for study. The severity of sore throat, hoarseness and cough were graded on a 4 point scale (0-3) and pain was assessed using 1-10 Numerical Pain Scale at 0 hr,1 hr,2 hr,4hr,8 hr,12hr,24 hr and compared among patients nebulised with Dexmedetomidine ,Dexamethasone and normal saline.

Demographic distribution in our study revealed that mean age of patients was 47.12 in Group I, 48.78 in Group II and 46.64 in Group III. Age and gender were evenly distributed in the three study groups.

Patients were haemodynamically stable and there was no significant difference in vital parameters such as heart rate, systolic and diastolic blood pressure and mean arterial pressure among three groups during and post nebulisation. Cuff pressures were monitored at 0 hr,1 hr,2 hr and 3 hr intraoperatively and reduced to less than 25 cm of H_2O when ever find to be increased. In study conducted by Sangeetha and Jacob et al. the anesthesiologists were able to inflate the cuff to an optimal cuff pressure (20 -30 cm H_2O) only in 64% cases. The cuff pressures were recorded as low in 17.3% while in 18.7% of cases the cuff pressure reached above the optimal range. They concluded that even experienced anesthesiologists are not able to inflate the endotracheal cuff upto optimal cuff pressure using subjective assessment alone. In all cases numerous factors have been recognised as those affecting incidence of POST, including duration of surgery, mallampati grading, intracuff pressure as well as endotracheal tube size but our study showed a comparable distribution of these parameters among three groups. [23]

We found that patients nebulised with Dexmedetomidine had lower incidence of sore throat in first 4 hours in the postoperative period as compared to patients nebulised with dexamethasone, but this difference was not statistically significant, indicating that both dexmedetomidine and dexamethasone were similar in terms of reducing the incidence of POST . Significant difference was seen in the incidence of sore throat in patients nebulised with Dexmedetomidine from those who were nebulised with normal saline (p value <0.002).There was reduction in both incidence and severity of sore throat in patients nebulised with Dexmedetomidine in comparison to patients nebulised with saline group .Also there was reduced incidence and severity of hoarseness in patients nebulised with Dexmedetomidine in comparison to patients with normal saline , the difference was stastically significant till 24 hrs . Patients nebulised with Dexmedetomidine and Dexamethasone did not complain of cough postoperatively till 24 hours. In group of patients nebulised with normal saline, 1 out of 50 patients experienced mild cough which is however

not statistically significant. Throat Pain was highest in Group III (normal saline) postoperatively till 24 hours when compared with Group I(Dexmedetomidine) and Group II(Dexamethasone).In contrast to our findings, study conducted by Thomas D. et al showed an overall incidence of POST of only 17 %, with 20% incidence of POST in Dexmedetomidine group. In our study the overall incidence of POST was 37.33% which was much higher than incidence of POST in their study. Our study had three groups including a control group in which patients were nebulised with normal saline in comparison to study conducted by Thomas D et al in which patients were nebulised with dexmedetomidine or ketamine with no control group which could have accounted for increased overall incidence of POST in our study. However the incidence of sore throat after nebulisation with dexmedetomidine was 22 % in our study which is close to their value. Their study has been done specifically in patients undergoing thyroidectomy and patients with ASA >II , MPS > II and COPD were excluded unlike our study in which patients with ASA III , MPS III and COPD were included. They did not measure cuff pressure intraoperatively, while in our study cuff pressure was measured hourly and maintained <25 cm H_2O.[2] In another study conducted by Jandial K and Tabassum S, incidence of POST was 12.5 % in patients nebulised with dexmedetomidine postoperatively at 4th hour which was comparatively higher in our study (22%). Patients with COPD, mallampati grade greater than II were excluded from their study unlike our study. The cuff pressure of the endotracheal tube were adjusted between 20 and 22 cm of H_2O every 30 minutes while we checked it hourly and was maintained below 25 cm of H_2O whenever found to be increased. Lesser frequency of cuff pressure monitoring and inclusion of patients with expected difficult intubation might be the cause of higher incidence of POST in our study.[29]

The incidence of POST in dexamethasone group (34%) in our study was much higher in comparison to study done by Mohamed G et al. (6.7%). They included only ASA I patients and the size of of endotracheal tubes used was fixed to 7.5 mm in males and 7 mm in

female patients respectively While we used ETT of 7-7.5 mm (ID)for females and 8-8.5 mm (ID) ETT in males. They also excluded expected difficult intubations with mallampati scoring III or IV, nasogastric tube insertion which were included in our study, thus explaining the lower incidence of sore throat in their study.[27] While the incidence of POST was comparable to the study done by Ashwini H et al which reported an incidence of 27.5 % in patients nebulised with Dexamethasone. None of the patients in group D (Dexamethasone) had postoperative cough, hoarseness or any adverse effect, four grade score for hoarseness and cough was not used in their study. Incidence of hoarseness was 6% in our study at 4th hour but no patients presented with cough or other side effects. Both these studies evaluated the effectiveness of nebulised Dexamethasone in reducing POST.[12]

In contrast to our study, Mostafa RH et al conducted study in children (6-16 years) which showed higher incidence of POST (66.67 %) in group that received nebulised 0.16 mg fixed dose of Dexamethasone. The use of smaller dose was thought to be the cause of difference in results from other studies in which fixed single dose of 8 mg nebulised Dexamethasone was used. In our study 8 mg was used and lower incidence and severity of POST were seen.[28]

There are few limitations of our study. First, we did not measure serum concentrations of the study group drugs, Dexamethasone and Dexmedetomidine to monitor drug levels during study period. Secondly, the scale used to assess the POST score was a subjective scale and may be associated with bias.

Despite the limitations, our study design offered few advantages: All observations were carried out by a single observer to eliminate any inter observer variability and the intubations were done by an expert anaesthesiologist with more than 3 years of experience to all subjects of our study .Secondly endotracheal tubes of age appropriate size were used and cuff pressure of endotracheal tubes were checked and maintained below 25 cm of H_2O, as increased cuff pressures are associated with higher incidence of POST.

We thus conclude from the results that 50 mcg of nebulised Dexmedetomidine is as effective as 8 mg of nebulised Dexamethasone in reducing both the incidence and severity of post operative sore throat, hoarseness, cough and pain in the postoperative period when administered preoperatively 15 minutes prior to intubation and can be used as an alternative to dexamethasone .

SUMMARY AND CONCLUSIONS

The present study was conducted in the department of Anaesthesiology, Dayanand Medical College and Hospital, Ludhiana after getting approval from the institutional Ethical Committee. The aim was to compare the effectiveness of nebulised Dexmedetomidine and Dexamethasone in reducing incidence and severity of postoperative sore throat in patients posted for elective procedures undergoing general anaesthesia with endotracheal intubation. 150 patients belonging to ASA I, II or III were included in a randomised, double blind manner after obtaining a written informed consent. Patients were randomly allocated using computer generated random numbers to either of the three groups to receive-

Group I-

Comprising of 50 patients each who received 50 mcg of nebulised Dexmedetomidine diluted in 5 ml Normal saline

Group II –

Comprising of 50 patients each who received 8 mg of nebulised Dexamethasone diluted in 5ml Normal saline

Group III-

Comprising of 50 patients each who received 5ml of nebulised Normal saline

The patients were nebulised preoperatively for 10 minutes with allocated study drug, 15 minutes before induction of general anesthesia and endotracheal intubation done by experienced anaesthesiologist. Cuff pressures were monitored hourly and reduced to 25 cm of H_2O whenever found to be increased. Vital parameters SBP, DBP, MAP, HR and SpO_2 were monitored intraoperatively and in postoperative period till 24 hours.

We observed 1) Incidence and severity of POST was significantly reduced in both group I and group II in comparison to group III (saline group). 2) There was reduced incidence of hoarseness and pain in group I and group II in comparison to group III. 3) There was no significant difference in incidence of cough in three groups 4) Patients

were haemodynamically stable in all the three groups and no adverse effects were seen.

Hence from results of our study we conclude that 50 mcg of nebulised Dexmedetomidine is as effective as 8mg of nebulised Dexamethasone for reducing the incidence of post operative sore throat.

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S. no	MRD no.	Intials	Group	Age	Sex	Name of surgery	Date of surgery	Duration of surgery	Duration of surgery(min)	Height	Weight	ASA grade	Mallampati grade	Diabetes mellitus	Hypertension	OSA	COPD	Any other	Size of endotracheal tube
1	569447	RS	3	74	M	Lap chole	18-06-2021	1 hour	60	5'9"	70	I	II	yes	no	no	no	no	8.5
2	1124420	HK	1	39	F	tah + b/l salpingectomy	19-06-2021	2 hour	120	5'6''	70	II	II	no	yes	no	no	hypothyroidism	7.5
3	1122239	N	2	35	F	laprotomy	21-06-2021	2 hours	120	5'3"	67	I	II	no	no	no	no	no	7.5
4	1111419	GJ	2	43	F	tlh	23-06-2021	2 hour 30 min	150	5'6"	75	II	II	no	no	no	no	hypothyroidism	7.5
5	1117177	AB	2	45	F	tlh	23-06-2021	3 hour	180	5'2"	60	II	III	no	no	no	no	hypothyroidism	7.5
6	1086056	SS	1	23	M	stoma closure	26-06-2021	2 hour	120	5'7"	39	III	III	no	no	no	no	post covid	8
7	949665	P	1	52	M	Lap chole	28-06-2021	2 hour	120	5'8"	78	II	II	no	yes	no	no	no	8.5
8	113036	S	2	28	F	hysteroscopy and laproscopy	02-07-2021	1 hour	60	5'5"	68	I	II	no	no	no	no	no	7.5
9	1131667	RR	1	57	F	lap and proceed	06-07-2021	1 hour	60	5'0"	62	I	II	no	no	no	no	no	7.5
10	1130045	KK	2	60	F	Hystrectomy	03-07-2021	1 hour	60	5'2"	60	III	III	yes	yes	yes	no	k/c/o ca endometrium	7.5
11	1165834	CK	1	48	F	lap chole	08-09-2021	2 hour 30 min	150	5'4"	75	I	III	no	no	no	no	no	7.5
12	1159236	KW	2	64	F	TAH+BSO	11-09-2021	2 hours	120	5'3"	58	III	III	yes	yes	no	no	CKD	7.5
13	287377	DG	1	67	M	lap chole	16-09-2021	1 hour	60	5'7"	60	III	III	yes	yes	no	no	CAD	8
14	1150201	KK	3	23	F	lap chole	16-09-2021	2 hours	120	5'3"	42	I	I	no	no	no	no	no	7.5
15	1168873	HK	2	27	F	lap chole	17-09-2021	2 hours	120	5'3"	68	II	I	no	no	no	no	no	7.5
16	1175380	AB	1	46	F	tlh+lap chole	18-09-2021	3 hours	180	5'3"	79	I	II	no	no	no	no	no	7.5
17	1130509	GS	2	28	M	laprotomy	22-09-2021	2 hour 30 min	150	5'8"	60	II	II	no	no	no	no	no	8
18	1199556	SK	1	67	F	TAH+BSO+lap chole	02-11-2021	3 hours	180	5'3"	83	II	III	no	no	no	no	hypothyroidism	7.5
19	1202575	AK	2	45	M	globe exploration	06-11-2021	1hour 30min	90	5'8"	68	I	III	no	no	no	no	no	8
20	1195395	SS	3	57	M	LAR	06-11-2021	3 hours	180	5'8"	76	III	I	no	no	no	no	no	8.5
21	59477	S	1	42	F	Hystrectomy	09-11-2021	2 hour	120	5'3"	76	I	III	no	no	no	no	no	7.5
22	587337	SK	2	49	F	TAH + BSO	09-11-2021	2 hour 45 min	165	5'4"	70	II	II	no	no	no	no	hyperthyroidism	7.5
23	1203169	HK	1	23	F	exp laprotomy	10-11-2021	2 hours	120	5'3"	62	III	II	no	no	no	no	no	7.5
24	1191089	HK	2	38	F	Hystrectomy	10-11-2021	2 hour 15 min	135	5'3"	68	II	II	no	no	no	no	hypothyroidism	7.5
25	1162775	R	3	32	F	lap hystrectomy	18-11-2021	1 hour 40 min	100	5'3"	64	I	II	no	no	no	no	no	7.5
26	1194094	DS	2	34	M	lap chole	19-11-2021	1 hour	60	5'10"	75	I	III	no	no	no	no	no	8.5
27	3449	RN	2	43	F	lap chole	20-11-2021	1 hour	60	5'4"	65	I	III	no	no	no	no	no	7.5
28	1072886	S	1	38	M	Mesh repair	25-11-2021	1 hour	60	5'5"	55	I	III	no	no	no	no	no	7.5
29	1211826	RD	3	20	M	limberg flap repair	26-11-2021	1 hour 45 min	105	5'9"	63	I	I	no	no	no	no	no	8
30	1055456	RD	2	66	M	lap chole	26-11-2021	2 hour	120	5'6"	86	II	III	no	yes	no	no	no	8.5
31	1225001	BS	1	58	M	ORIF zygoma	17-12-2021	2 hours	120	5'7"	75	II	III	no	no	no	no	no	8.5
32	1210709	SS	1	43	F	PCNL	17-12-2021	1 hour 30 min	90	5'8"	53	II	III	no	no	no	no	hyperthyroidism	8
33	1225575	AS	3	62	F	Endoscopic debridement	22-12-2021	2 hour	120	5'9"	85	III	III	no	no	no	no	smoker,alcholic,hiv +ve	8.5
34	120895	S	3	20	F	grafting	28-01-2022	2 hour	120	5'6"	70	III	II	no	no	no	no	post covid	7.5
35	1188045	SR	1	32	F	lap chole	31-01-2022	1 hour 30 min	90	5'4"	54	II	II	no	no	no	no	no	7.5
36	1245665	G	2	40	F	endo DCR	31-01-2022	2 hour 30 min	150	5'0"	50	I	II	no	no	no	no	no	7.5
37	1220687	S	1	49	F	tlh+ b/l oopherectomy	28-01-2022	2 hour	120	5'7 "	98	II	II	no	no	no	no	hypothyroidism	7.5
38	125725	R	1	32	F	Lap and proceed	25-02-2022	1hour 30min	90	5'2"	52	II	II	no	no	no	no	abdomnal TB	7.5
39	1259467	R	2	25	F	FESS	25-02-2022	2hours	120	5'3"	62	I	I	no	no	no	no	no	7.5
40	1252073	G	3	63	F	ETEP	25-02-2022	2hour 30min	150	5'5"	70	I	III	no	no	no	no	no	8
41	1210541	IK	1	70	F	Stoma closure	24-02-2022	2hour 20min	140	5'10"	70	II	III	no	no	no	no	no	7.5
42	1150866	MK	2	26	F	Lap chole	25-02-2022	2hours	120	5'2"	58	II	II	no	no	no	no	hypothyroidism	7.5
43	690257	AS	3	40	M	Lap chole	25-02-2022	2hour	120	5'11"	60	II	II	no	no	no	no	CML	8
44	347937	PS	3	66	M	inguinal hernia repair	25-02-2022	2 hour	120	6'0	80	I	II	no	no	no	no	no	8.5
45	1252941	AS	3	24	M	tympanoplasty	25-02-2022	3 hours	180	5'8"	68	I	I	no	no	no	no	no	8.5
46	1258923	NM	1	50	M	lap chole	25-02-2022	2 hours	120	5'2"	86	II	II	no	yes	yes	no	hypothyroidism	7.5
47	1257893	JB	3	18	M	septoturbinoplasty	25-02-2022	1 hour 45 min	105	5'8"	65	I	I	no	no	no	no	no	8.5
48	850617	SK	2	64	F	lap chole	01-03-2022	1hour 45min	105	5'2"	95	II	III	no	no	no	no	post covid, obese	7.5
49	1261633	B	1	47	M	Tonsillectomy	04-03-2022	2hours 50min	170	5'8"	76	II	III	no	no	no	no	HCV positive	8
50	1263366	AB	2	20	M	Lap Appendicectomy	04-03-2022	1hour	60	5'8"	56	I	II	no	no	no	no	no	8.5

S. no	MRD no.	No. of attempts in insertion of ETT	Cuff pressure_ 0 hr	Cuff pressure_ 1 hr	Cuff pressure_ 2 hr	Cuff pressure_ 3 hr	Sore throat grade _0 hr	Sore throat grade _1 hr	Sore throat grade _2 hr	Sore throat grade _4 hr	Sore throat grade _8 hr	Sore throat grade _12 hr	Sore throat grade _24 hr	Cough grade _0 hr	Cough grade _1 hr	Cough grade _2 hr	Cough grade _4 hr	Cough grade _8 hr	Cough grade _12 hr	Cough grade _24 hr	Hoarseness grade _0 hr
1	569447	2	30	22	-	-	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0
2	1124420	1	26	20	28	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	1122239	1	24	20	28	-	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
4	1111419	1	30	32	30	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	1117177	1	28	22	30	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	1086056	1	28	20	26	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	949665	1	26	22	20	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	113036	1	24	28	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	1131667	1	26	20	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
10	1130045	1	24	22	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	1165834	1	22	20	22	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	1159236	1	24	20	22	-	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0
13	287377	1	26	24	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	1150201	1	20	20	22	-	2	2	1	1	0	0	0	1	1	1	1	0	0	0	2
15	1168873	1	32	30	28	-	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
16	1175380	1	28	30	24	22	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0
17	1130509	1	32	30	26	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	1199556	1	20	22	25	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	1202575	1	20	24	-	-	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0
20	1195395	1	22	20	20	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	59477	1	20	25	25	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	587337	1	22	20	25	-	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0
23	1203169	1	22	20	24	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	1191089	1	25	22	25	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	1162775	1	20	20	-	-	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
26	1194094	1	22	20	-	-	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
27	3449	1	26	30	-	-	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
28	1072886	1	25	25	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	1211826	1	25	25	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	1055456	1	26	20	28	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	1225001	1	26	28	20	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
32	1210709	1	35	30	-	-	2	2	2	2	2	1	1	0	0	0	0	0	0	0	0
33	1225575	1	30	20	25	-	2	2	2	2	2	1	1	0	0	0	0	0	0	0	1
34	120895	1	32	34	30	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	1188045	1	36	20	-	-	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
36	1245665	1	30	20	25	-	2	2	2	2	1	1	0	0	0	0	0	0	0	0	0
37	1220687	1	30	28	20	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	125725	1	24	28	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	1259467	1	26	24	20	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	1252073	1	28	28	26	-	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0
41	1210541	1	20	24	25	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
42	1150866	1	26	20	24	-	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
43	690257	1	28	26	20	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	347937	1	26	28	24	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45	1252941	1	28	20	30	28	2	2	2	2	0	0	0	0	0	0	0	0	0	0	0
46	1258923	1	30	25	30	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	1257893	1	35	25	-	-	2	2	2	2	2	1	1	0	0	0	0	0	0	0	1
48	850617	1	26	24	-	-	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0
49	1261633	1	24	26	20	-	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
50	1263366	1	20	24	-	-	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0

S. no	MRD no.	Hoarseness grade _1 hr	Hoarseness grade _2 hr	Hoarseness grade _4 hr	Hoarseness grade _8 hr	Hoarseness grade _12 hr	Hoarseness grade _24 hr	Pain grade _0 hr	Pain grade _1 hr	Pain grade _2 hr	Pain grade _4 hr	Pain grade _8 hr	Pain grade _12 hr	Pain grade _24 hr	HR_Baseline	HR_During nebulisation	HR_5 min	HR_10 min	HR_after nebulisation	HR_5 min	HR_10 min	HR_Before intubation	HR_After intubation
1	569447	0	0	0	0	0	0	0	0	0	0	0	0	0	100	98	95	94	93	96	90	80	82
2	1124420	0	0	0	0	0	0	0	0	0	0	0	0	0	85	84	86	86	86	86	85	74	96
3	1122239	0	0	0	0	0	0	0	0	0	0	0	0	0	95	95	94	96	94	94	94	96	98
4	1111419	0	0	0	0	0	0	3	3	3	3	2	2	1	65	64	64	63	64	64	65	68	59
5	1117177	0	0	0	0	0	0	0	0	0	0	0	0	0	76	73	74	78	73	74	73	78	84
6	1086056	0	0	0	0	0	0	0	0	0	0	0	0	0	101	102	98	100	99	98	98	104	109
7	949665	0	0	0	0	0	0	0	0	0	0	0	0	0	80	84	86	84	84	88	88	103	120
8	113036	0	0	0	0	0	0	0	0	0	0	0	0	0	94	94	92	87	86	88	86	90	94
9	1131667	1	1	1	1	0	0	0	0	0	0	0	0	0	80	83	86	82	80	81	80	87	92
10	1130045	0	0	0	0	0	0	0	0	0	0	0	0	0	100	98	95	96	98	96	95	80	118
11	1165834	0	0	0	0	0	0	0	0	0	0	0	0	0	90	89	91	90	94	92	88	96	118
12	1159236	0	0	0	0	0	0	0	0	0	0	0	0	0	78	78	76	77	78	76	79	80	88
13	287377	0	0	0	0	0	0	0	0	0	0	0	0	0	60	62	64	62	60	61	66	74	79
14	1150201	2	2	2	2	2	2	0	0	0	0	0	0	0	106	108	107	109	108	106	107	100	110
15	1168873	0	0	0	0	0	0	0	0	0	1	0	0	0	64	65	66	64	65	62	64	64	60
16	1175380	0	0	0	0	0	0	2	2	2	2	1	1	0	80	82	85	84	88	80	84	85	94
17	1130509	0	0	0	0	0	0	0	0	0	0	0	0	0	96	98	97	99	100	99	97	102	110
18	1199556	0	0	0	0	0	0	0	0	0	0	0	0	0	88	88	86	84	80	84	85	88	92
19	1202575	0	0	0	0	0	0	0	0	0	0	0	0	0	84	80	82	88	86	87	88	74	80
20	1195395	0	0	0	0	0	0	0	0	0	0	0	0	0	62	62	64	63	65	63	64	70	80
21	59477	0	0	0	0	0	0	0	0	0	0	0	0	0	94	95	98	96	94	90	92	88	102
22	587337	0	0	0	0	0	0	0	0	0	0	0	0	0	81	78	75	74	78	74	75	77	75
23	1203169	0	0	0	0	0	0	0	0	0	0	0	0	0	108	109	108	107	108	107	106	108	118
24	1191089	0	0	0	0	0	0	0	0	0	0	0	0	0	81	80	78	80	82	78	76	82	98
25	1162775	0	0	0	0	0	0	0	0	0	0	0	0	0	78	76	74	78	78	76	77	70	85
26	1194094	0	0	0	0	0	0	0	0	0	0	0	0	0	70	72	72	74	74	72	70	90	90
27	3449	0	0	0	0	0	0	0	0	0	0	0	0	0	80	78	80	79	78	78	76	90	100
28	1072886	0	0	0	0	0	0	0	0	0	0	0	0	0	89	90	92	88	94	92	90	90	80
29	1211826	0	0	0	0	0	0	0	0	0	0	0	0	0	78	74	75	76	75	74	72	68	88
30	1055456	0	0	0	0	0	0	0	0	0	0	0	0	0	78	76	74	76	78	79	84	72	92
31	1225001	2	1	1	1	0	0	4	4	2	2	1	0	0	86	84	88	87	83	88	86	68	108
32	1210709	0	0	0	0	0	0	0	0	0	0	0	0	0	71	72	76	78	74	70	76	74	90
33	1225575	1	1	1	1	1	0	6	6	7	6	5	5	4	62	64	60	58	64	66	70	60	88
34	120895	0	0	0	0	0	0	2	2	2	1	1	0	0	122	124	122	120	120	117	118	120	134
35	1188045	0	0	0	0	0	0	1	1	1	0	0	0	0	110	111	108	112	110	109	108	117	122
36	1245665	0	0	0	0	0	0	0	0	0	0	0	0	0	100	108	104	102	106	102	99	108	110
37	1220687	0	0	0	0	0	0	1	1	0	0	0	0	0	88	88	86	84	88	84	84	74	92
38	125725	0	0	0	0	0	0	0	0	0	0	0	0	0	130	128	124	126	120	128	124	126	136
39	1259467	0	0	0	0	0	0	0	0	0	0	0	0	0	80	84	82	80	78	76	75	90	94
40	1252073	0	0	0	0	0	0	4	4	4	4	2	2	2	88	84	86	85	84	84	82	76	98
41	1210541	1	1	1	1	0	0	2	2	2	2	1	1	0	80	84	82	86	85	84	85	78	96
42	1150866	0	0	0	0	0	0	0	0	0	0	0	0	0	86	84	80	85	80	84	86	85	97
43	690257	0	0	0	0	0	0	5	5	4	4	3	3	2	80	84	85	86	88	86	87	88	87
44	347937	0	0	0	0	0	0	0	0	0	0	0	0	0	65	64	62	60	68	70	74	70	88
45	1252941	0	0	0	0	0	-	0	0	0	0	0	0	0	65	66	68	64	64	60	62	58	80
46	1258923	0	0	0	0	0	0	1	1	0	0	0	0	0	110	112	112	114	108	108	114	104	112
47	1257893	1	1	1	0	0	0	0	0	0	0	0	0	0	118	116	114	120	121	119	115	110	128
48	850617	0	0	0	0	0	0	0	0	0	0	0	0	0	90	88	84	86	85	82	80	82	80
49	1261633	0	0	0	0	0	0	0	0	0	0	0	0	0	82	80	80	84	85	88	86	78	79
50	1263366	0	0	0	0	0	0	0	0	0	0	0	0	0	82	80	84	80	86	80	84	78	97

S. no	MRD no.	HR_Intraoperatively 0 hr	HR_1 hr	HR_2 hr	HR_3 hr	HR_Postop 0 hr	HR_ 1 hr	HR_ 2 hr	HR_ 4 hr	HR_ 8 hr	HR_1 2 hr	HR_24 hr	SBP_Baseline	SBP_During nebulisation	SBP_5 min	SBP_10 min	SBP_after nebulisation	SBP_5 min	SBP_10 min	SBP_Before intubation	SBP_After intubation	SBP_Intraoperatively 0 hr	SBP_ 1 hr	SBP_ 2 hr	SBP_ 3 hr
1	569447	96	88	-	-	100	88	87	89	92	79	78	140	140	144	146	140	138	136	126	150	127	115	123	-
2	1124420	80	78	76	-	92	64	58	64	68	70	67	112	110	110	110	110	112	110	94	130	118	109	112	-
3	1122239	81	73	77	-	63	68	72	92	104	90	89	120	120	120	120	120	118	120	124	110	139	125	124	-
4	1111419	54	52	59	-	76	64	62	66	70	70	64	120	120	120	112	122	124	120	126	114	108	109	118	-
5	1117177	83	80	84	86	80	97	86	85	84	80	84	120	120	120	122	120	118	120	128	112	140	130	130	130
6	1086056	110	104	92	-	118	89	88	74	89	78	76	100	100	100	102	100	100	104	100	110	98	96	94	-
7	949665	124	122	110	-	112	108	106	100	101	96	90	150	150	150	148	152	150	150	150	158	160	150	140	-
8	113036	90	86	-	-	80	80	82	84	86	70	74	100	108	108	104	108	108	106	120	124	122	120	-	-
9	1131667	80	85	-	-	54	56	68	64	62	98	88	110	110	110	110	107	108	110	108	110	130	140	-	-
10	1130045	116	88	-	-	109	98	88	98	99	100	88	140	140	140	140	140	140	140	100	104	168	147	-	-
11	1165834	101	102	100	-	118	114	108	108	98	96	88	100	100	102	101	100	104	90	114	148	120	140	130	-
12	1159236	80	78	69	-	86	78	74	72	64	68	66	130	128	127	124	120	122	118	100	110	122	136	140	-
13	287377	76	70	78	-	89	80	68	60	64	62	60	110	110	110	114	116	114	120	124	148	140	144	138	-
14	1150201	98	88	86	-	78	62	68	64	66	68	70	120	110	110	112	110	109	108	112	124	120	128	130	-
15	1168873	44	76	78	-	72	74	80	74	70	68	69	100	100	100	108	100	104	102	100	110	110	100	90	-
16	1175380	86	80	80	76	80	84	82	83	84	88	86	120	120	124	120	120	118	114	124	130	120	140	130	140
17	1130509	112	120	120	-	100	98	98	99	94	92	97	100	100	100	108	110	108	110	108	120	110	108	120	-
18	1199556	82	84	78	80	98	92	94	94	92	90	93	140	140	140	140	140	142	144	140	134	138	150	115	140
19	1202575	86	82	-	-	82	80	76	74	70	72	80	120	124	120	118	124	120	124	118	132	110	118	-	-
20	1195395	82	84	80	88	76	70	70	68	64	63	64	140	140	144	140	140	140	140	130	124	118	116	124	120
21	59477	81	75	80	-	108	98	96	90	88	84	80	120	124	120	120	124	122	122	118	138	132	118	112	-
22	587337	68	64	69	-	74	72	70	76	74	68	70	142	140	138	136	138	136	138	90	110	114	120	118	-
23	1203169	110	100	104	-	108	106	104	100	102	99	100	110	110	110	110	114	114	110	110	100	104	106	102	-
24	1191089	90	104	100	-	98	98	97	96	90	88	87	140	138	140	140	140	140	140	140	136	130	138	136	-
25	1162775	88	80	82	-	73	75	78	80	82	70	75	140	138	130	134	130	134	138	98	110	140	124	-	-
26	1194094	88	80	-	-	98	80	84	86	88	80	88	124	120	120	120	120	122	120	110	140	140	120	-	-
27	3449	104	98	-	-	76	74	72	74	74	70	78	140	140	140	138	138	138	136	140	150	120	110	-	-
28	1072886	88	60	62	-	-	79	77	76	78	77	74	100	100	100	98	98	107	108	110	120	120	124	120	124
29	1211826	90	92	-	-	76	78	78	72	70	68	84	120	120	120	120	120	116	124	96	110	118	116	-	-
30	1055456	78	80	72	-	78	76	78	76	74	70	78	120	120	120	120	120	120	118	100	124	120	120	130	-
31	1225001	84	88	84	-	112	88	84	80	88	90	86	140	142	144	146	140	146	142	118	152	148	120	124	-
32	1210709	90	78	-	-	80	77	87	86	78	76	78	120	120	120	120	120	110	128	90	130	120	118	-	-
33	1225575	84	60	58	-	90	77	78	84	68	60	66	130	150	150	140	148	140	152	110	162	140	118	120	-
34	120895	124	98	88	-	128	126	128	120	117	112	120	110	108	107	106	110	110	110	100	120	100	110	110	-
35	1188045	111	110	-	-	117	112	110	114	112	114	110	90	90	90	94	95	90	90	90	108	114	106	-	-
36	1245665	114	110	90	-	104	101	100	90	84	88	80	100	96	98	96	100	100	98	90	108	104	101	106	-
37	1220687	90	84	82	-	101	97	90	88	89	84	86	140	140	138	140	140	140	140	110	150	140	138	130	-
38	125725	120	114	-	-	136	124	120	122	124	118	126	120	120	124	126	128	120	124	112	136	134	120	-	-
39	1259467	92	96	95	-	102	74	72	76	75	70	72	120	118	114	116	124	120	128	134	132	138	110	114	-
40	1252073	81	84	85	-	92	90	78	76	84	88	80	132	130	130	130	130	134	134	118	140	120	124	120	-
41	1210541	80	84	86	-	94	82	76	74	72	76	76	90	98	100	104	116	114	104	99	106	110	100	106	-
42	1150866	88	76	78	-	76	78	74	68	89	88	82	130	134	130	130	130	130	136	102	128	124	118	120	-
43	690257	80	84	88	-	86	87	88	84	80	78	87	120	120	124	120	120	120	120	110	136	120	144	136	-
44	347937	60	64	62	-	70	68	66	68	64	62	67	120	120	122	120	124	130	128	100	130	120	110	118	-
45	1252941	64	68	62	60	78	74	72	66	62	64	68	120	120	124	120	124	120	124	110	140	110	112	114	120
46	1258923	100	110	98	-	114	108	109	102	99	106	108	130	130	130	130	130	134	136	100	150	140	120	130	-
47	1257893	120	110	-	-	126	116	112	110	114	108	112	120	120	120	120	124	128	125	90	130	136	120	-	-
48	850617	94	92	-	-	84	85	86	84	85	86	85	110	114	116	118	112	110	114	90	108	130	128	-	-
49	1261633	84	82	86	-	98	99	96	95	94	95	96	130	124	120	124	126	120	124	120	118	124	130	126	-
50	1263366	100	84	-	-	87	84	88	86	87	88	84	124	120	118	116	114	112	118	98	134	120	124	-	-

S. no	MRD no.	SBP_Postop 0 hr	SBP_ 1 hr	SBP_ 2 hr	SBP_ 4 hr	SBP_ 8 hr	SBP_1 2 hr	SBP_ 24 hr	DBP_Baseline	DBP_During nebulisation	DBP_5 min	DBP_10 min	DBP_after nebulisation	DBP_5 min	DBP_10 min	DBP_Before intubation	DBP_After intubation	DBP_Intraoperatively 0 hr	DBP_ 1 hr	DBP_ 2 hr	DBP_ 3 hr	DBP_Postop 0 hr	DBP_ 1 hr	DBP_ 2 hr	DBP_ 4 hr	DBP_ 8 hr
1	569447	145	136	125	127	110	114	118	90	84	80	80	85	80	74	78	76	66	59	-	-	100	96	83	78	70
2	1124420	140	90	90	98	110	110	110	80	80	70	70	70	70	70	60	78	63	77	80	-	70	60	62	65	70
3	1122239	120	110	110	132	130	120	120	80	80	80	80	80	80	80	80	70	90	85	80	-	80	70	70	94	90
4	1111419	118	110	104	100	108	114	105	80	80	80	80	80	80	80	70	68	64	68	64	-	60	70	60	56	60
5	1117177	142	122	120	120	120	124	120	80	80	80	80	80	70	80	80	70	82	80	72	80	82	76	80	80	80
6	1086056	134	100	98	98	106	104	100	60	60	60	58	60	60	60	60	58	60	58	60	-	78	56	60	60	60
7	949665	170	160	150	148	130	130	140	80	80	80	80	80	80	80	90	98	100	90	90	-	100	100	100	96	80
8	113036	114	110	110	120	120	112	110	60	60	60	62	64	60	62	80	80	80	80	-	-	70	70	70	80	80
9	1131667	100	100	110	130	124	130	130	70	70	70	70	80	74	70	70	80	90	100	-	-	80	60	80	80	68
10	1130045	140	138	120	124	130	128	110	90	90	90	90	90	90	90	60	80	70	80	-	-	90	86	78	80	76
11	1165834	140	138	120	138	130	130	120	60	60	57	60	60	70	60	70	100	82	80	80	-	80	78	78	72	70
12	1159236	130	120	124	110	110	108	109	80	80	82	84	80	78	70	70	70	80	70	80	-	70	70	70	70	70
13	287377	140	144	138	130	120	130	136	80	80	70	70	72	70	80	70	70	78	80	78	-	70	90	80	80	80
14	1150201	98	102	106	108	110	100	104	70	80	82	80	80	78	72	80	82	80	82	80	-	62	62	60	70	70
15	1168873	106	108	110	106	104	100	94	50	52	56	52	50	54	57	59	70	70	60	60	-	64	66	70	69	60
16	1175380	144	140	130	130	128	110	124	70	80	80	70	78	76	72	80	98	80	90	72	80	84	80	72	70	80
17	1130509	108	107	110	108	110	120	107	60	60	60	68	70	62	70	60	70	70	72	76	-	70	60	70	70	70
18	1199556	168	170	160	190	180	183	180	80	78	76	70	72	72	78	80	80	70	80	70	70	90	86	90	90	90
19	1202575	112	110	108	104	110	109	120	70	72	80	76	70	74	70	70	76	70	68	-	-	74	70	76	70	70
20	1195395	176	170	160	176	168	158	148	90	90	98	90	90	90	90	80	80	70	70	80	70	114	112	100	100	90
21	59477	134	128	110	90	100	90	110	80	80	70	80	80	80	80	70	90	65	63	60	-	70	80	70	60	60
22	587337	130	120	120	110	110	124	120	89	88	80	80	80	80	84	82	68	70	78	70	-	88	80	70	70	70
23	1203169	100	108	106	116	108	109	104	70	70	70	70	70	70	70	72	80	70	64	60	-	70	74	70	70	70
24	1191089	124	120	117	116	120	109	104	80	82	80	80	80	80	80	80	80	88	90	92	-	80	80	70	60	80
25	1162775	130	124	128	130	134	128	118	70	70	70	70	80	80	80	64	80	70	80	-	-	70	70	80	70	70
26	1194094	130	130	128	118	120	119	124	80	80	80	80	80	80	80	80	90	84	80	-	-	90	80	70	64	80
27	3449	110	110	100	110	114	120	110	80	80	80	80	80	80	80	80	90	70	70	-	-	80	70	90	70	70
28	1072886	119	118	114	110	120	118	116	60	70	70	70	68	70	74	60	68	60	64	64	70	79	80	70	70	70
29	1211826	118	100	110	114	120	124	124	80	80	80	80	80	72	70	60	70	70	78	-	-	70	70	70	78	80
30	1055456	120	118	110	116	100	124	120	70	70	70	80	80	80	80	70	80	78	80	80	-	80	70	70	70	60
31	1225001	142	130	124	120	118	130	128	80	78	80	78	80	84	80	70	88	84	78	84	-	100	90	70	80	70
32	1210709	120	110	116	120	124	100	110	80	80	80	80	80	80	80	60	90	80	70	-	-	70	70	78	80	86
33	1225575	164	158	140	150	140	144	130	80	80	80	80	80	80	90	70	100	80	60	70	-	92	90	90	80	80
34	120895	130	124	120	117	124	120	110	70	70	60	70	70	70	70	64	84	78	70	84	-	70	70	64	80	80
35	1188045	108	106	98	92	104	96	94	60	60	54	60	60	60	60	50	78	70	68	-	-	60	68	60	68	60
36	1245665	100	98	90	96	90	98	96	60	62	68	60	60	54	60	58	60	70	60	70	-	70	64	60	58	50
37	1220687	150	154	148	142	130	138	140	90	88	90	86	90	90	90	70	100	84	80	74	-	100	90	84	80	78
38	125725	124	120	124	118	104	116	109	70	84	80	70	70	80	80	74	100	90	84	-	-	80	84	76	74	70
39	1259467	126	120	120	118	109	104	128	84	85	88	89	80	80	80	70	78	64	70	62	-	64	60	74	70	72
40	1252073	138	130	130	118	114	120	124	84	80	80	80	80	80	80	76	96	80	78	84	-	78	76	70	80	68
41	1210541	110	114	118	120	124	120	124	60	64	68	60	70	74	70	68	70	60	74	64	-	70	78	70	70	80
42	1150866	118	116	114	90	110	120	124	70	78	80	80	80	80	88	64	92	86	74	70	-	74	70	78	40	70
43	690257	118	102	106	104	120	124	110	70	80	80	80	80	80	80	70	78	80	68	70	-	74	70	78	70	70
44	347937	120	110	114	112	110	110	100	70	80	78	80	78	70	74	70	80	80	70	64	-	70	70	80	70	70
45	1252941	140	130	134	110	90	100	110	80	80	80	70	78	80	80	64	88	80	78	80	70	80	70	50	70	60
46	1258923	150	148	144	130	130	136	140	70	70	70	80	80	84	90	70	70	80	80	70	-	80	80	70	80	90
47	1257893	138	130	110	120	124	120	110	80	80	80	80	80	90	80	60	80	78	80	-	-	89	70	70	80	88
48	850617	112	110	110	114	118	116	114	70	76	70	74	76	70	76	60	78	80	78	-	-	74	70	70	74	70
49	1261633	120	118	116	112	110	116	118	80	78	70	74	70	74	70	78	70	80	84	70	-	74	70	74	70	74
50	1263366	118	112	116	110	118	120	124	80	80	74	70	74	70	76	64	70	60	64	-	-	64	60	74	70	74

S. no	MRD no.	DBP_ 12 hr	DBP_ 24 hr	MAP_Baseline	MAP_During nebulisation	MAP_5 min	MAP_10 min	MAP_after nebulisation	MAP_5 min	MAP_10 min	MAP_Before intubation	MAP_After intubation	MAP_Intraoperatively 0 hr	MAP_ 1 hr	MAP_ 2 hr	MAP_ 3 hr	MAP_Postop 0 hr	MAP_ 1 hr	MAP_ 2 hr	MAP_4 hr	MAP_ 8 hr	MAP_ 12 hr	MAP_ 24 hr
1	569447	65	64	107	103	101	102	103	99	95	97	101	86	78	-	-	115	109	97	94	83	81	82
2	1124420	70	70	91	90	83	83	83	84	83	71	95	81	88	91	-	93	70	71	76	83	83	83
3	1122239	80	80	93	93	93	93	93	93	93	95	83	106	98	95	-	93	83	83	107	103	93	93
4	1111419	60	66	93	93	93	91	94	95	93	89	83	79	82	82	-	79	83	75	71	76	78	79
5	1117177	70	80	93	93	93	94	93	86	93	96	84	101	97	91	97	102	91	93	93	93	88	93
6	1086056	56	58	73	73	73	73	73	73	75	73	75	73	71	71	-	97	71	73	73	75	72	72
7	949665	80	90	103	103	103	103	104	103	103	111	118	60	110	107	-	123	120	117	113	97	97	107
8	113036	68	70	73	76	76	76	79	76	77	93	95	94	93	-	-	85	83	83	93	93	83	83
9	1131667	74	70	83	83	83	83	89	85	83	83	90	103	113	-	-	87	73	90	97	87	93	90
10	1130045	80	70	107	107	107	107	107	107	107	73	88	103	102	-	-	107	103	92	95	94	96	83
11	1165834	90	90	73	73	72	74	73	81	70	85	116	95	100	97	-	100	98	92	94	90	103	100
12	1159236	60	60	97	96	97	97	93	93	86	80	83	94	92	100	-	90	87	88	83	83	76	76
13	287377	74	80	90	90	83	85	87	85	93	88	96	101	101	98	-	93	108	99	97	93	93	99
14	1150201	60	70	87	90	91	91	90	90	84	91	96	93	97	97	-	74	75	75	83	83	73	81
15	1168873	60	50	72	68	71	71	67	71	72	73	83	83	73	70	-	78	81	83	81	75	73	65
16	1175380	70	70	87	93	95	87	92	90	86	95	109	93	107	91	100	104	100	91	90	96	83	88
17	1130509	70	68	73	73	73	81	83	77	83	76	87	83	84	91	-	89	76	83	83	83	87	81
18	1199556	84	86	100	99	97	93	95	95	100	100	98	93	103	85	93	116	114	113	123	120	117	117
19	1202575	76	80	87	89	93	90	88	89	88	93	95	83	85	-	-	87	83	87	81	83	87	93
20	1195395	80	70	107	107	113	107	107	107	107	97	88	86	85	95	87	135	131	102	125	116	106	103
21	59477	60	70	93	95	87	93	95	94	94	86	106	87	81	77	-	91	96	83	70	73	70	83
22	587337	70	72	107	105	99	99	99	101	101	75	83	90	87	93	-	102	93	87	83	83	88	88
23	1203169	70	68	83	83	83	83	85	85	83	83	87	81	78	74	-	80	85	82	85	83	83	80
24	1191089	70	70	100	101	100	100	100	100	100	100	99	102	106	107	-	95	93	86	79	93	83	81
25	1162775	72	80	93	93	90	91	97	98	99	75	90	93	95	92	-	90	88	89	90	91	91	93
26	1194094	70	80	95	93	93	93	93	94	93	90	107	103	93	-	-	103	103	89	82	93	86	95
27	3449	70	70	100	100	100	99	99	99	99	100	110	87	83	-	-	90	83	93	83	85	87	83
28	1072886	70	70	73	80	80	79	78	82	85	77	85	80	84	83	88	92	93	85	83	87	86	85
29	1211826	80	80	93	93	93	93	93	87	88	72	83	86	91	-	-	86	80	83	90	93	93	95
30	1055456	70	80	87	87	87	93	93	93	93	80	95	92	93	97	-	93	86	85	85	73	88	93
31	1225001	80	78	100	99	101	101	100	105	101	86	109	105	92	97	-	114	103	88	93	86	99	93
32	1210709	60	70	93	93	93	93	93	93	96	70	103	93	86	-	-	87	83	91	93	99	73	83
33	1225575	78	80	97	103	103	100	103	100	111	83	121	100	79	87	-	116	113	107	103	100	100	97
34	120895	80	70	83	83	76	82	83	83	83	76	96	85	83	93	-	90	88	83	92	95	93	83
35	1188045	70	68	70	70	66	71	72	70	70	63	88	85	81	-	-	76	81	73	76	75	79	77
36	1245665	64	68	73	73	78	72	73	69	73	69	76	81	74	82	-	80	75	70	71	63	75	78
37	1220687	70	80	107	105	106	104	107	107	107	83	117	103	99	95	-	117	111	105	101	95	93	100
38	125725	68	69	87	96	95	89	89	93	95	87	112	105	96	-	-	95	93	92	89	81	84	82
39	1259467	70	70	96	96	97	98	95	93	96	91	96	89	83	79	-	85	80	89	86	84	85	89
40	1252073	64	60	100	97	97	97	97	98	98	90	111	93	93	96	-	98	94	90	93	83	83	81
41	1210541	70	76	70	75	79	75	85	87	81	78	82	77	83	78	-	83	90	86	87	95	87	92
42	1150866	80	86	90	97	97	97	97	97	104	77	104	99	89	87	-	89	85	90	57	83	93	99
43	690257	80	70	87	93	95	93	93	93	93	83	97	93	93	92	-	89	81	87	81	87	95	83
44	347937	70	70	87	93	93	93	93	90	92	80	97	87	83	82	-	87	83	91	84	83	83	80
45	1252941	70	70	93	90	93	87	93	93	95	79	105	90	89	91	87	106	90	78	83	70	80	83
46	1258923	80	70	90	90	90	97	97	101	105	80	110	100	93	90	-	103	103	95	97	103	99	93
47	1257893	80	70	93	93	93	93	95	103	95	70	97	97	93	-	-	105	90	83	93	100	93	83
48	850617	70	74	83	89	85	89	88	83	89	70	88	97	95	-	-	87	83	83	87	86	85	87
49	1261633	70	76	97	93	87	91	89	89	88	92	86	95	99	89	-	89	86	88	84	83	85	90
50	1263366	70	74	95	93	89	85	87	84	90	75	91	80	84	-	-	82	77	88	83	89	87	91

S. no	MRD no.	SPO2_Baseline	SPO2_During nebulisation	SPO2_5 min	SPO2_10 min	SPO2_after nebulisation	SPO2_5 min	SPO2_10 min	SPO2_Before intubation	SPO2_After intubation	SPO2_Intraoperatively 0 hr	SPO2_ 1 hr	SPO2_ 2 hr	SPO2_ 3 hr	SPO2_Postop 0 hr	SPO2_ 1 hr	SPO2_ 2 hr	SPO2_ 4 hr	SPO2_ 8 hr	SPO2_1 2 hr	SPO2_ 24 hr
1	569447	98	99	99	98	98	98	97	100	100	100	100	-	-	96	97	97	98	98	98	97
2	1124420	100	100	100	100	100	100	100	100	100	100	100	100	-	100	100	100	100	100	100	100
3	1122239	97	97	97	97	97	97	97	100	100	100	100	100	-	94	96	96	96	94	98	98
4	1111419	100	100	100	100	100	100	100	100	100	100	100	100	-	95	99	99	98	96	95	99
5	1117177	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	98	98	96	97
6	1086056	100	100	100	100	100	100	100	100	100	100	100	100	-	100	100	100	100	100	100	100
7	949665	96	97	97	97	98	98	98	98	99	100	100	100	-	95	96	96	97	98	98	98
8	113036	100	100	98	100	100	99	99	99	100	100	100	-	-	99	97	97	100	98	98	99
9	1131667	100	100	98	98	92	98	100	99	99	100	100	-	-	95	97	97	98	98	98	98
10	1130045	100	100	99	100	99	98	98	100	100	100	100	-	-	98	99	98	97	96	97	98
11	1165834	97	96	97	97	98	100	100	100	100	97	97	97	-	100	99	99	99	99	98	99
12	1159236	98	98	98	99	100	99	98	100	100	100	100	100	-	96	97	97	98	97	97	98
13	287377	97	97	98	100	98	99	99	96	100	100	100	100	-	97	98	98	98	99	97	99
14	1150201	98	99	98	99	99	98	99	98	99	100	100	100	-	99	99	97	98	98	99	99
15	1168873	98	100	100	100	100	100	100	100	100	100	100	100	-	100	100	100	100	100	100	100
16	1175380	99	100	98	100	100	99	99	99	100	100	100	100	-	100	100	99	99	99	100	99
17	1130509	99	100	100	100	100	100	100	100	100	100	100	100	-	100	100	100	100	99	99	100
18	1199556	96	97	98	98	97	97	97	100	100	100	100	100	100	100	99	98	99	99	99	99
19	1202575	97	97	97	98	98	99	97	100	100	98	99	-	-	98	99	99	98	97	97	98
20	1195395	99	99	99	99	99	99	100	100	100	100	100	100	100	96	98	98	97	96	97	98
21	59477	100	100	100	100	100	100	100	100	100	100	98	99	-	98	97	99	98	98	98	98
22	587337	100	100	100	100	100	100	100	100	100	100	100	100	-	95	96	96	97	98	98	99
23	1203169	98	99	100	100	100	98	99	98	100	100	100	100	-	100	100	100	100	99	99	99
24	1191089	98	100	100	100	100	99	99	100	100	100	100	100	-	100	100	100	100	100	98	98
25	1162775	99	100	100	100	100	100	100	100	100	100	100	-	-	100	100	100	100	100	100	100
26	1194094	98	98	100	100	100	100	100	100	100	100	100	-	-	98	98	97	98	96	97	98
27	3449	98	99	100	100	100	100	98	100	100	100	100	-	-	100	100	99	99	99	98	98
28	1072886	98	99	100	100	100	100	100	98	100	100	100	-	-	100	100	98	98	98	100	96
29	1211826	99	100	100	100	100	100	100	100	100	100	100	-	-	100	100	96	99	98	99	99
30	1055456	98	100	100	100	100	100	100	100	100	100	100	100	-	99	98	98	98	99	98	98
31	1225001	97	98	100	100	100	98	99	98	100	100	100	100	-	97	96	97	98	97	98	97
32	1210709	98	99	100	100	100	100	100	100	100	100	100	-	-	100	100	99	99	100	99	99
33	1225575	98	99	100	100	99	99	100	100	100	100	100	100	-	98	97	97	97	98	96	97
34	120895	98	100	100	100	99	100	100	100	100	100	100	-	-	98	96	96	97	97	96	97
35	1188045	98	98	99	100	100	100	100	100	100	100	100	-	-	100	100	98	97	98	98	98
36	1245665	99	100	100	100	100	100	98	100	100	100	100	100	-	95	90	97	97	97	98	96
37	1220687	98	99	100	100	99	100	99	100	100	100	100	100	-	100	100	100	100	100	100	100
38	125725	100	99	100	100	100	100	100	100	100	100	100	-	-	98	99	98	99	99	100	100
39	1259467	99	99	100	100	100	99	99	100	100	100	100	100	-	94	95	95	95	97	97	97
40	1252073	98	99	99	99	99	98	99	99	100	99	99	100	-	98	98	97	97	99	99	99
41	1210541	99	98	100	99	99	99	98	100	100	100	100	99	-	97	98	98	99	99	98	99
42	1150866	98	98	99	99	100	99	99	100	100	100	100	100	-	99	98	98	99	99	99	99
43	690257	99	100	100	100	99	99	99	100	100	100	100	100	-	100	100	99	98	98	99	100
44	347937	97	98	100	99	99	99	99	100	100	100	100	100	-	100	98	99	97	97	97	97
45	1252941	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99	99	99	99	98
46	1258923	97	99	100	100	100	99	100	100	100	100	98	100	-	96	96	97	97	97	97	97
47	1257893	99	100	100	100	100	100	99	100	100	100	100	-	-	100	99	99	99	99	99	98
48	850617	99	98	99	98	99	99	98	98	99	100	100	-	-	99	98	98	98	99	98	99
49	1261633	98	98	99	98	99	98	99	99	100	100	100	100	-	99	98	99	99	98	99	98
50	1263366	98	96	96	98	98	99	100	100	100	100	100	-	-	99	99	98	99	98	99	98

S. no	MRD no.	Intials	Group	Age	Sex	Name of surgery	Date of surgery	Duration of surgery	Duration of surgery(min)	Height	Weight	ASA grade	Mallampati grade	Diabetes mellitus	Hypertension	OSA	COPD	Any other	Size of endotracheal tube
51	1257886	B	3	39	F	MRM Rt side	04-03-2022	3hours	180	5'1"	60	I	III	no	no	no	no	no	7.5
52	1262371	R	2	49	F	lap chole	04-03-2022	1hour	60	5'1"	50	I	I	no	no	no	no	no	7
53	1262257	MS	1	27	M	septoturbinoRhinoplasty	04-03-2022	3hours	180	5'11"	91	I	III	no	no	no	no	no	8.5
54	1263218	J	1	42	M	FESS	04-03-2022	1hour 45min	105	5'9"	60	I	I	no	no	no	no	no	8
55	1192412	G	2	31	M	Appendicectomy	05-03-2022	1hour 30min	90	0'10"	72	I	I	no	no	no	no	no	8.5
56	1263260	MA	3	52	F	Hysterectomy	05-03-2022	3hours	180	5'2"	68	II	I	yes	yes	no	no	hypothyroidism	7.5
57	1193396	V	2	61	M	Appendicectomy	05-03-2022	1hour 30min	90	5'11"	87	I	II	no	no	no	no	no	8.5
58	1263004	S	1	42	F	Myomectomy	11-03-2022	1hour45min	105	5'2"	64	II	II	yes	no	no	no	no	7.5
59	1268724	JS	3	48	M	Lap chole	16-03-2022	2hour 30min	150	5'11"	80	II	I	no	no	no	no	Alcoholic	8.5
60	113738	LS	2	24	M	Lap chole	17-03-2022	1hour 15min	75	5'8"	68	I	I	no	no	no	no	no	8.5
61	1259517	TS	1	55	M	Exfixator removal+plating	19-03-2022	2hours	120	5'6"	80	III	III	yes	no	no	no	no	8
62	1179528	PM	3	32	F	Lap chole	21-03-2022	1hour	60	5'2"	54	I	II	no	no	no	no	no	7.5
63	1271567	SR	2	40	F	TLH	11-04-2022	3hours	180	5'3"	53	I	I	no	no	no	no	no	7
64	1284184	IS	2	50	M	Lap chole	14-04-2022	2hours	120	5'6"	72	III	III	yes	no	no	no	CAD, post PTCA	8.5
65	385964	PT	3	53	M	Lap chole	11-04-2022	2hour 15min	135	5'8"	66	II	II	no	yes	no	no	chr. Alcoholic	8.5
66	1224058	SA	3	57	M	ETEP	15-04-2022	2hour 40min	160	5'6"	65	II	I	no	yes	no	no	post cobid	8.5
67	1287796	RT	2	78	M	Lap chole	15-04-2022	2hours	120	5'2"	72	III	III	no	yes	no	no	hypothyroidism	7.5
68	1250162	AR	1	50	F	Lap chole	15-04-2022	1hour 30min	90	5'2"	72	III	III	no	yes	no	no	CVA	7.5
69	182550	S	1	34	F	Lap chole	15-04-2022	1hour 45min	105	4'10"	35	I	I	no	no	no	no	no	7
70	1214417	RG	1	58	M	inguinal hernia repair	18-04-2022	1hour 25min	85	5'7"	60	II	II	yes	yes	no	no	no	8.5
71	1293879	B	2	23	M	Lap Appendicectomy	28-04-2022	1hour 15min	75	5'6"	84	I	II	no	no	no	no	no	8
72	1228202	MK	3	40	M	tympanoplasty	28-04-2022	2 hour 10 minutes	130	5'10"	77	I	III	no	no	no	no	no	8.5
73	80791	S	3	61	F	ventral hernia repair	30-04-2022	3 hours	180	5'0"	99	III	III	yes	no	no	no	no	7.5
74	520367	R	3	27	F	tympanoplasty	30-04-2022	1 hour	60	5'2"	44	I	III	no	no	no	no	no	7
75	1281588	TR	1	68	M	PCNL	03-05-2022	1 hour	60	5'10"	83	II	I	no	no	no	no	bronchial asthma	8
76	491545	SK	2	64	F	POEM	06-05-2022	2hours	120	5'8"	63	II	I	no	yes	no	no	no	7.5
77	1283085	S	3	37	F	poem	06-05-2022	1 hour 10 min	70	5'1"	64	III	II	no	no	no	no	hypothyroidism	7.5
78	1297359	KK	3	50	F	Antegrade DBE	07-05-2022	2hour	120	5'5"	46	II	III	no	no	no	no	Anaemia,Hypoalbumin	7.5
79	1298412	SK	2	68	M	FESS	11-05-2022	2hour 30min	150	55"	64	III	III	yes	yes	no	no	Parkinsonism	8.5
80	1261280	KK	1	30	F	FESS+Septoturbinoplasty	11-05-2022	2hours	120	5'3"	59	I	III	no	no	no	no	no	7.5
81	806762	S	3	30	F	lap chole	11-05-2022	2 hour 30 min	150	5'8"	71	I	II	no	no	no	no	no	7
82	1299588	PK	1	39	F	Laprotomy	12-05-2022	2 hour 30 min	150	5'3"	62	III	III	no	no	no	no	mod MR , PAH	7.5
83	990732	RK	3	55	F	Lap chole	20-05-2022	1 hour 30 min	90	5'8"	68	II	III	no	no	no	no	schizophrenia	8.5
84	1288666	PS	2	42	F	TLH	21-05-2022	2 hour 30 min	150	5'3"	80	II	II	no	no	no	no	no	7.5
85	1296528	BR	3	47	F	lap chole	24-05-2022	1 hour 15 min	75	5'11"	60	II	II	no	yes	no	no	no	8.5
86	699572	SK	3	75	M	Lap chole	24-05-2022	1 HOUR	60	5'3"	76	II	II	yes	no	no	no	reformed smoker	8.5
87	1310928	K	1	46	F	septoturbinoplasty	25-05-2022	2 hours	120	5'7"	90	II	I	no	no	no	no	no	7.5
88	1311695	SR	2	62	F	RT nephrectomy	28-05-2022	3 hours	180	5'2"	50	II	III	no	yes	no	no	no	7.5
89	1317866	RK	3	39	F	umblical hernia repair	06-06-2022	2 hours	120	5'3"	93	II	II	no	no	no	no	hypothyroidism	7.5
90	1312925	RSA	1	67	M	lap chole	06-06-2022	1hour 30min	90	5'10"	54	II	III	yes	no	no	no	post covid	7.5
91	529302	MK	2	62	F	lap chole	07-06-2022	3hours	180	5'3"	78	II	II	no	yes	no	no	no	7.5
92	1309979	KK	3	41	F	TLH	07-06-2022	3 hours	180	5'2"	59	I	I	no	no	no	no	no	7
93	1310324	V	1	34	F	necrosectomy	07-06-2022	2 hour	120	5'11"	74	II	II	no	no	no	no	hypothyroidism	8.5
94	1318475	DL	2	50	F	Laprotomy	07-06-2022	3 hours	180	5'10"	84	III	III	yes	no	no	no	no	8.5
95	1318080	MK	2	47	F	open cholecystectomy	07-06-2022	2 hours	120	5'3"	84	II	II	no	yes	no	no	no	7.5
96	1317673	AK	3	58	M	lap chole	07-06-2022	1 hour	60	5'8"	83	III	II	no	no	no	no	CAD	8.5
97	1334788	SK	2	80	F	ORIF Lt Elbow	08-06-2022	2hour	120	5'1"	70	I	II	no	no	no	no	no	7.5
98	1319275	GK	2	65	F	explo laprotomy	08-06-2022	2hour 15min	135	5'2"	85	III	III	yes	yes	no	no	no	7.5
99	1319459	TD	3	73	F	lap chole	09-06-2022	1hour 45min	105	5'6"	90	III	III	no	yes	yes	no	no	7.5
100	1319713	HS	1	66	M	lap chole	10-06-2022	1 hour 45 min	105	5'8"	64	III	I	no	yes	no	no	post cabg	8

S. no	MRD no.	No. of attempts in insertion of ETT	Cuff pressure_ 0 hr	Cuff pressure_ 1 hr	Cuff pressure_ 2 hr	Cuff pressure_ 3 hr	Sore throat grade _0 hr	Sore throat grade _1 hr	Sore throat grade _2 hr	Sore throat grade _4 hr	Sore throat grade _8 hr	Sore throat grade _12 hr	Sore throat grade _24 hr	Cough grade _0 hr	Cough grade _1 hr	Cough grade _2 hr	Cough grade _4 hr	Cough grade _8 hr	Cough grade _12 hr	Cough grade _24 hr	Hoarseness grade _0 hr
51	1257886	1	32	28	36	30	2	2	1	1	0	0	0	0	0	0	0	0	0	0	1
52	1262371	1	24	20	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53	1262257	1	32	28	36	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54	1263218	1	24	20	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	1192412	1	34	28	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56	1263260	1	28	36	30	25	2	1	1	1	1	1	0	0	0	0	0	0	0	0	1
57	1193396	1	26	32	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58	1263004	1	30	24	-	-	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1
59	1268724	1	30	26	36	-	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0
60	113738	1	28	20	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61	1259517	1	26	34	28	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62	1179528	1	20	26	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
63	1271567	1	24	26	28	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
64	1284184	1	30	26	24	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	385964	1	28	25	26	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
66	1224058	1	25	24	28	-	2	2	2	2	2	1	1	0	0	0	0	0	0	0	0
67	1287796	1	30	26	20	-	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
68	1250162	1	30	26	-	-	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
69	182550	1	28	24	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	1214417	1	26	28	-	-	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0
71	1293879	1	26	28	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
72	1228202	1	28	26	28	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
73	80791	1	30	28	24	26	2	1	2	1	0	0	0	0	0	0	0	0	0	0	0
74	520367	1	25	28	-	-	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0
75	1281588	1	30	26	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
76	491545	1	28	36	30	-	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0
77	1283085	1	25	26	-	-	2	2	1	1	0	0	0	0	0	0	0	0	0	0	2
78	1297359	1	24	20	25	-	2	2	2	2	2	1	1	0	0	0	0	0	0	0	2
79	1298412	1	24	28	30	-	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
80	1261280	1	24	20	28	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81	806762	1	24	20	28	-	2	2	2	1	1	1	0	0	0	0	0	0	0	0	2
82	1299588	1	24	26	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
83	990732	1	24	20	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
84	1288666	1	24	28	20	-	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
85	1296528	1	26	24	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
86	699572	1	20	28	-	-	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
87	1310928	1	25	28	20	-	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
88	1311695	1	20	24	26	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
89	1317866	1	28	30	26	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	1312925	1	20	28	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
91	529302	1	24	28	20	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
92	1309979	1	34	26	28	30	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
93	1310324	1	32	30	28	-	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
94	1318475	1	26	30	28	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95	1318080	1	26	28	30	-	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
96	1317673	1	34	26	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
97	1334788	1	26	34	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
98	1319275	1	32	26	28	-	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0
99	1319459	1	28	26	-	-	2	2	1	1	1	1	1	0	0	0	0	0	0	0	2
100	1319713	1	28	30	-	-	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0

S. no	MRD no.	Hoarseness grade _1 hr	Hoarseness grade _2 hr	Hoarseness grade _4 hr	Hoarseness grade _8 hr	Hoarseness grade _12 hr	Hoarseness grade _24 hr	Pain grade _0 hr	Pain grade _1 hr	Pain grade _2 hr	Pain grade _4 hr	Pain grade _8 hr	Pain grade _12 hr	Pain grade _24 hr	HR_Baseline	HR_During nebulisation	HR_5 min	HR_10 min	HR_after nebulisation	HR_5 min	HR_10 min	HR_Before intubation	HR_After intubation
51	1257886	1	1	0	0	0	0	2	2	2	1	1	1	1	108	107	104	110	108	107	104	99	124
52	1262371	0	0	0	0	0	0	0	0	0	0	0	0	0	74	76	70	72	70	74	72	74	78
53	1262257	0	0	0	0	0	0	4	4	4	3	3	2	1	98	96	97	98	95	90	96	98	64
54	1263218	0	0	0	0	0	0	0	0	0	0	0	0	0	82	84	80	85	86	85	84	78	76
55	1192412	0	0	0	0	0	0	3	3	3	2	2	1	1	88	86	84	82	80	79	78	76	98
56	1263260	1	1	1	1	0	0	0	0	0	0	0	0	0	80	84	82	82	80	84	86	86	98
57	1193396	0	0	0	0	0	0	0	0	0	0	0	0	0	68	66	64	66	68	68	76	70	108
58	1263004	1	1	0	0	0	0	2	2	2	1	1	1	0	68	67	64	63	66	68	66	64	86
59	1268724	0	0	0	0	0	0	0	0	0	0	0	0	0	78	74	76	74	72	70	76	70	99
60	113738	0	0	0	0	0	0	0	0	0	0	0	0	0	85	80	78	76	74	70	72	85	92
61	1259517	0	0	0	0	0	0	5	3	3	3	2	2	1	80	84	82	81	80	78	76	75	99
62	1179528	0	0	0	0	0	0	0	0	0	0	0	0	0	127	124	128	126	124	125	120	118	124
63	1271567	0	0	0	0	0	0	0	4	2	0	0	0	0	84	86	86	84	82	86	84	82	84
64	1284184	0	0	0	0	0	0	0	0	0	0	0	0	0	80	84	85	86	88	84	85	80	98
65	385964	0	0	0	0	0	0	0	0	0	0	0	0	0	80	84	85	86	84	82	84	78	106
66	1224058	0	0	0	0	0	0	0	0	0	0	0	0	0	62	64	66	68	64	66	68	64	78
67	1287796	0	0	0	0	0	0	2	2	2	1	1	1	1	70	74	72	76	74	76	80	76	88
68	1250162	0	0	0	0	0	0	6	6	4	4	2	1	1	84	85	84	83	84	83	82	78	97
69	182550	0	0	0	0	0	0	0	0	0	0	0	0	0	78	76	74	70	76	84	80	78	89
70	1214417	0	0	0	0	0	0	2	2	1	1	0	0	0	69	66	64	68	74	72	68	58	90
71	1293879	0	0	0	0	0	0	0	0	0	0	0	0	0	84	80	82	86	78	78	80	72	80
72	1228202	0	0	0	0	0	0	2	2	2	1	1	0	0	94	94	96	98	92	95	98	89	108
73	80791	0	0	0	0	0	0	0	0	0	0	0	0	0	84	82	88	86	84	83	86	78	89
74	520367	0	0	0	0	0	0	1	1	1	0	0	0	0	90	88	87	88	86	84	85	68	98
75	1281588	0	0	0	0	0	0	0	0	0	0	0	0	0	80	84	82	85	86	84	80	78	99
76	491545	0	0	0	0	0	0	2	2	2	1	1	1	1	108	106	109	105	107	105	108	90	112
77	1283085	2	2	2	2	2	2	1	1	1	1	0	0	0	84	85	84	83	80	86	88	74	90
78	1297359	2	2	2	2	2	2	0	0	0	0	0	0	0	84	85	85	84	85	84	82	78	84
79	1298412	0	0	0	0	0	0	0	0	0	0	0	0	0	70	74	70	76	74	75	76	78	84
80	1261280	0	0	0	0	0	0	0	0	0	0	0	0	0	89	88	86	84	82	80	86	78	96
81	806762	2	2	2	2	2	2	4	4	2	2	2	2	2	60	64	60	65	68	64	74	68	89
82	1299588	0	0	0	0	0	0	0	0	0	0	0	0	0	86	84	82	80	82	85	84	80	96
83	990732	0	0	0	0	0	0	0	0	0	0	0	0	0	76	74	78	70	74	72	70	69	78
84	1288666	0	0	0	0	0	0	0	0	0	0	0	0	0	75	72	70	67	66	64	68	64	87
85	1296528	2	1	1	1	0	0	6	6	4	4	2	2	1	68	64	66	67	68	69	70	68	96
86	699572	0	0	0	0	0	0	1	1	1	0	0	0	0	89	90	72	74	76	78	76	78	80
87	1310928	0	0	0	0	0	0	0	0	0	0	0	0	0	98	96	92	90	92	94	90	86	108
88	1311695	0	0	0	0	0	0	0	0	0	0	0	0	0	74	74	75	72	70	70	74	62	87
89	1317866	0	0	0	0	0	0	0	0	0	0	0	0	0	78	74	76	72	70	74	76	62	82
90	1312925	0	0	0	0	0	0	0	0	0	0	0	0	0	64	62	64	60	66	64	62	54	86
91	529302	0	0	0	0	0	0	0	0	0	0	0	0	0	80	81	82	84	85	84	80	72	92
92	1309979	0	0	0	0	0	0	0	0	0	0	0	0	0	82	84	83	82	81	80	78	70	110
93	1310324	0	0	0	0	0	0	0	0	0	0	0	0	0	128	124	120	122	126	128	124	120	138
94	1318475	0	0	0	0	0	0	0	0	0	0	0	0	0	98	96	94	93	92	90	89	78	108
95	1318080	0	0	0	0	0	0	0	0	0	0	0	0	0	108	106	104	112	108	114	112	98	124
96	1317673	0	0	0	0	0	0	0	0	0	0	0	0	0	62	64	66	68	66	64	65	58	88
97	1334788	2	2	1	0	0	0	0	0	0	0	0	0	0	88	84	85	86	87	88	90	86	94
98	1319275	0	0	0	0	0	0	0	0	0	0	0	0	0	140	138	130	128	124	128	130	108	120
99	1319459	2	2	0	0	0	0	0	0	0	0	0	0	0	74	75	78	76	74	78	75	76	98
100	1319713	0	0	0	0	0	0	0	0	0	0	0	0	0	90	94	95	93	92	94	95	74	94

S. no	MRD no.	HR_Intraoperatively 0 hr	HR_1 hr	HR_2 hr	HR_3 hr	HR_Postop 0 hr	HR_ 1 hr	HR_ 2 hr	HR_ 4 hr	HR_ 8 hr	HR_1 2 hr	HR_24 hr	SBP_Baseline	SBP_During nebulisation	SBP_5 min	SBP_10 min	SBP_after nebulisation	SBP_5 min	SBP_10 min	SBP_Before intubation	SBP_After intubation	SBP_Intraoperatively 0 hr	SBP_ 1 hr	SBP_ 2 hr	SBP_ 3 hr
51	1257886	110	96	80	84	108	107	104	94	90	87	88	160	164	162	166	150	154	158	156	184	164	118	124	132
52	1262371	80	82	-	-	86	84	82	80	78	76	84	118	114	110	114	120	118	124	120	126	120	124	-	-
53	1262257	70	74	76	78	76	74	74	75	76	80	84	110	108	106	104	106	107	108	100	124	100	104	108	105
54	1263218	78	76	-	-	90	92	94	95	84	82	80	128	124	120	124	120	120	118	116	118	120	124	-	-
55	1192412	80	84	-	-	85	86	88	89	76	70	78	110	114	118	116	117	114	110	114	136	124	128	-	-
56	1263260	70	84	75	76	108	98	78	76	75	78	84	110	114	118	116	117	114	117	118	116	120	154	110	132
57	1193396	110	98	-	-	114	110	76	74	72	70	68	110	114	116	118	110	114	112	100	150	124	120	-	-
58	1263004	74	78	-	-	98	96	98	94	90	89	88	100	104	108	106	99	98	94	90	108	120	110	-	-
59	1268724	84	82	80	-	96	94	94	98	97	96	98	120	110	114	112	116	118	116	120	144	140	148	126	-
60	113738	84	104	-	-	110	102	100	98	96	92	84	130	132	136	140	144	138	136	140	146	140	144	-	-
61	1259517	88	84	83	-	84	86	78	76	74	70	78	130	134	136	138	138	140	132	108	179	164	130	144	-
62	1179528	108	114	-	-	108	90	98	99	106	118	108	110	114	112	120	116	114	116	98	109	124	130	-	-
63	1271567	84	76	86	88	84	85	84	82	84	85	88	100	99	100	102	104	110	114	112	100	94	104	96	102
64	1284184	96	94	92	-	88	82	80	84	86	87	86	140	146	144	140	142	146	148	144	170	164	146	142	-
65	385964	104	84	82	-	116	78	74	79	84	85	88	140	136	138	136	134	134	130	128	126	134	110	120	-
66	1224058	48	50	56	-	66	62	65	68	66	68	68	140	144	150	148	146	144	144	136	134	140	132	144	-
67	1287796	114	80	84	-	88	86	88	84	78	72	88	140	144	146	142	140	138	139	132	146	124	120	126	-
68	1250162	86	88	-	-	89	84	85	86	88	86	82	110	110	108	110	110	107	108	104	109	144	132	-	-
69	182550	99	84	-	-	85	89	80	78	84	82	80	110	114	112	110	114	115	118	106	128	120	110	-	-
70	1214417	64	86	-	-	98	96	94	92	90	88	86	135	132	130	128	130	134	126	112	158	144	110	-	-
71	1293879	82	62	-	-	74	80	78	82	80	70	74	134	120	124	122	122	120	120	90	130	120	120	-	-
72	1228202	98	80	82	-	89	88	86	84	90	82	87	110	110	110	108	112	106	108	110	140	100	104	106	-
73	80791	80	84	80	84	92	89	86	88	84	78	79	140	140	140	140	140	140	138	110	164	120	122	120	124
74	520367	80	84	-	-	88	86	84	78	80	78	79	120	124	126	128	124	120	122	100	140	128	99	-	-
75	1281588	84	82	-	-	90	88	84	82	80	78	82	130	130	130	134	130	136	134	110	150	120	124	-	-
76	491545	80	84	88	-	96	95	88	84	88	86	78	160	164	160	158	160	156	166	128	170	150	122	117	-
77	1283085	80	84	-	-	98	95	86	84	92	80	78	130	134	135	128	134	130	134	112	140	120	130	-	-
78	1297359	108	128	112	-	108	104	102	92	84	82	80	90	94	96	96	98	100	99	98	99	134	140	136	-
79	1298412	64	62	60	-	76	78	84	80	82	86	88	140	144	140	146	146	138	136	120	132	134	104	124	-
80	1261280	90	80	74	-	88	76	74	79	74	76	84	110	114	112	110	108	104	108	110	114	120	110	126	-
81	806762	64	66	68	-	66	68	64	68	60	68	65	110	110	116	118	120	124	126	106	112	114	120	107	-
82	1299588	92	84	102	-	88	86	84	80	82	80	84	120	112	110	114	116	112	110	114	118	140	110	114	-
83	990732	70	64	-	-	72	70	68	69	76	74	78	138	134	130	130	136	134	128	114	128	130	124	-	-
84	1288666	84	68	80	-	84	82	81	78	76	74	76	130	124	120	124	100	118	116	118	130	124	132	120	-
85	1296528	94	72	-	-	69	72	68	63	64	62	60	130	124	120	124	120	118	120	110	130	120	96	-	-
86	699572	94	120	-	-	110	98	88	80	84	80	72	130	130	124	120	119	124	120	118	120	124	146	-	-
87	1310928	64	70	72	-	80	84	82	80	78	76	74	140	132	130	134	130	130	120	124	138	120	110	104	-
88	1311695	70	84	80	88	90	86	84	68	62	64	66	128	126	124	120	118	120	120	120	124	120	124	118	124
89	1317866	64	62	60	-	86	78	76	72	79	74	79	110	114	118	116	120	124	120	110	100	120	110	112	-
90	1312925	82	80	-	-	74	68	68	66	75	76	74	100	104	106	108	100	104	100	90	102	140	132	-	-
91	529302	84	86	82	80	99	84	82	80	76	82	88	110	114	112	110	108	109	110	104	128	124	114	122	108
92	1309979	100	80	84	86	56	58	64	66	68	70	69	126	124	120	126	128	130	128	128	130	120	110	124	130
93	1310324	120	110	100	-	129	128	126	130	124	122	120	120	124	125	126	128	126	124	90	100	100	110	120	-
94	1318475	112	114	110	114	118	108	104	99	96	102	100	114	116	112	110	114	118	120	104	140	130	110	120	130
95	1318080	120	90	94	-	108	104	106	99	98	97	94	180	184	182	178	178	174	176	140	188	184	120	118	-
96	1317673	62	64	-	-	76	68	66	64	62	66	67	130	134	136	130	132	130	134	120	148	140	120	-	-
97	1334788	80	84	86	-	99	90	88	84	86	78	76	120	124	126	128	126	128	124	118	130	128	124	126	-
98	1319275	110	100	98	-	94	98	96	92	94	90	89	140	136	134	130	142	146	140	138	160	120	150	130	-
99	1319459	78	80	-	-	108	98	97	96	88	78	76	150	154	150	148	142	140	144	124	160	140	120	-	-
100	1319713	80	84	-	-	98	96	88	84	85	78	82	146	148	142	146	144	142	140	110	155	120	124	-	-

S. no	MRD no.	SBP_Postop 0 hr	SBP_ 1 hr	SBP_ 2 hr	SBP_ 4 hr	SBP_ 8 hr	SBP_1 2 hr	SBP_ 24 hr	DBP_Baseline	DBP_During nebulisation	DBP_5 min	DBP_10 min	DBP_after nebulisation	DBP_5 min	DBP_10 min	DBP_Before intubation	DBP_After intubation	DBP_Intraoperatively 0 hr	DBP_ 1 hr	DBP_ 2 hr	DBP_ 3 hr	DBP_Postop 0 hr	DBP_ 1 hr	DBP_ 2 hr	DBP_ 4 hr	DBP_ 8 hr
51	1257886	126	124	126	130	134	135	120	90	94	95	98	99	98	96	95	106	100	74	96	98	96	98	94	80	84
52	1262371	118	116	120	116	118	110	114	70	74	70	74	70	74	70	74	70	64	78	-	-	70	74	70	72	70
53	1262257	98	96	100	104	107	110	108	70	76	78	76	78	79	80	60	75	60	66	64	68	54	56	60	64	68
54	1263218	120	144	140	138	136	130	132	90	84	80	86	80	80	74	70	74	70	74	-	-	80	74	70	74	70
55	1192412	132	120	118	116	104	110	116	70	74	70	76	74	76	70	74	86	60	58	-	-	86	84	80	82	80
56	1263260	100	110	98	99	104	107	104	70	78	80	82	80	84	80	86	85	80	78	70	80	60	70	64	68	66
57	1193396	124	130	136	134	130	128	124	80	78	76	70	70	78	70	64	98	68	66	-	-	68	90	78	80	96
58	1263004	108	106	104	100	96	98	90	60	64	68	80	64	58	52	98	76	64	80	-	-	78	76	74	62	66
59	1268724	146	118	110	116	106	104	102	82	70	74	70	70	87	86	84	90	80	78	84	-	102	80	70	74	70
60	113738	138	110	100	114	112	116	110	80	84	85	88	89	90	88	86	88	60	78	-	-	102	74	68	76	78
61	1259517	142	146	144	128	110	114	118	80	84	85	86	88	87	86	87	88	80	64	82	-	90	96	90	88	84
62	1179528	140	142	128	124	126	120	118	70	74	75	78	90	84	82	64	68	64	78	-	-	88	88	90	84	88
63	1271567	99	96	98	96	99	98	99	80	64	66	70	74	75	74	70	66	62	68	70	74	55	48	55	60	64
64	1284184	140	138	136	134	136	132	130	80	84	80	80	80	84	80	78	79	86	82	80	-	78	76	75	72	76
65	385964	118	107	104	118	114	108	104	90	84	80	84	80	82	80	74	78	100	74	78	-	60	58	64	60	64
66	1224058	140	142	140	136	138	134	136	90	88	80	86	84	80	80	78	76	100	88	80	-	84	86	80	78	76
67	1287796	136	134	130	128	124	120	130	74	76	77	76	80	90	90	80	84	80	66	88	-	84	80	86	86	78
68	1250162	121	120	120	114	104	102	110	70	76	74	75	76	80	84	80	89	80	76	-	-	78	76	74	70	78
69	182550	114	110	112	116	118	124	126	70	74	70	76	70	78	70	74	88	80	72	-	-	78	80	86	80	78
70	1214417	124	110	98	96	104	124	120	80	84	82	70	76	84	76	64	88	88	76	-	-	78	70	64	60	64
71	1293879	110	100	110	100	90	120	120	84	80	80	78	80	80	80	60	70	80	70	-	-	70	70	80	60	50
72	1228202	100	140	132	110	100	104	120	80	80	70	70	74	70	62	70	80	70	68	70	-	70	70	68	70	60
73	80791	130	120	110	114	120	114	120	90	80	80	80	84	70	80	64	108	80	70	74	80	80	70	70	80	70
74	520367	130	120	124	126	124	120	110	70	78	80	80	76	78	80	68	80	70	50	-	-	80	70	80	78	80
75	1281588	140	150	120	124	110	120	130	80	80	80	78	80	80	90	70	80	80	70	-	-	70	70	80	70	70
76	491545	175	164	150	144	152	140	137	90	90	90	89	96	80	84	90	90	88	80	84	-	106	96	80	90	100
77	1283085	140	110	120	114	110	120	100	90	80	80	90	86	80	80	72	100	80	84	-	-	80	70	80	70	80
78	1297359	110	114	120	118	116	114	112	60	68	70	68	64	66	64	60	64	80	84	80	-	70	72	70	79	74
79	1298412	126	110	136	134	142	136	138	80	78	70	72	70	74	70	64	78	80	64	66	-	80	70	80	78	70
80	1261280	120	120	118	116	112	108	118	70	72	70	70	76	70	74	70	70	70	64	60	-	70	74	70	76	70
81	806762	116	112	110	108	104	108	110	70	74	70	78	70	78	70	64	80	78	78	76	-	70	74	70	68	70
82	1299588	108	118	106	100	110	124	120	90	86	77	76	70	72	70	74	70	80	64	70	-	80	74	70	64	70
83	990732	110	118	120	120	106	90	100	90	98	90	90	88	80	84	80	82	80	68	-	-	70	74	70	70	80
84	1288666	126	110	114	112	110	108	104	90	80	90	88	60	84	80	74	80	68	80	80	-	74	70	76	68	74
85	1296528	132	130	128	110	114	112	110	70	74	70	70	80	64	80	74	70	56	52	-	-	80	84	80	70	76
86	699572	120	124	126	120	124	130	130	90	90	84	80	70	80	70	70	80	74	100	-	-	70	80	70	80	78
87	1310928	110	114	116	118	120	112	120	80	90	80	80	90	90	70	80	90	54	60	62	-	70	78	70	74	70
88	1311695	118	116	120	118	110	112	116	76	70	74	70	70	70	80	70	80	80	86	78	80	70	60	70	70	74
89	1317866	130	124	120	118	100	114	110	70	74	70	74	80	70	80	70	60	80	70	70	-	90	78	80	60	60
90	1312925	130	134	130	128	120	110	130	60	64	62	60	58	54	68	64	82	80	76	-	-	76	70	72	76	70
91	529302	130	128	120	116	90	100	110	86	85	85	80	86	85	84	72	89	80	75	72	62	74	70	80	80	68
92	1309979	160	150	142	136	128	124	120	70	78	80	79	84	70	73	70	78	80	70	80	90	84	80	84	90	86
93	1310324	138	136	110	100	104	108	106	80	84	80	84	82	80	80	60	70	60	60	64	-	90	80	70	60	70
94	1318475	130	100	120	124	128	110	114	78	80	80	70	80	84	80	80	88	84	70	86	78	88	60	80	76	80
95	1318080	174	178	174	170	170	168	176	100	108	110	100	100	98	104	90	112	108	84	80	-	100	98	96	94	90
96	1317673	110	140	124	122	126	120	120	90	98	94	80	86	80	84	90	100	90	84	-	-	70	80	90	80	84
97	1334788	110	118	124	116	117	112	110	70	76	70	74	78	75	74	70	89	82	80	84	-	70	74	70	75	74
98	1319275	140	142	130	124	110	128	130	85	80	85	78	70	74	70	78	90	70	76	70	-	80	85	80	70	70
99	1319459	178	144	130	138	139	126	135	100	102	100	99	90	88	90	90	100	80	60	-	-	110	100	96	70	60
100	1319713	140	130	134	136	130	120	110	90	94	98	96	94	90	80	72	80	80	75	-	-	90	90	80	78	70

S. no	MRD no.	DBP_ 12 hr	DBP_ 24 hr	MAP_Baseline	MAP_During nebulisation	MAP_5 min	MAP_10 min	MAP_after nebulisation	MAP_5 min	MAP_10 min	MAP_Before intubation	MAP_After intubation	MAP_Intraoperatively 0 hr	MAP_ 1 hr	MAP_ 2 hr	MAP_ 3 hr	MAP_Postop 0 hr	MAP_ 1 hr	MAP_ 2 hr	MAP_4 hr	MAP_ 8 hr	MAP_ 12 hr	MAP_ 24 hr
51	1257886	90	86	113	117	117	121	116	117	117	115	128	121	89	105	109	102	107	105	97	101	105	97
52	1262371	70	70	86	87	83	87	87	89	88	89	89	83	93	-	-	86	88	87	87	86	83	85
53	1262257	68	79	83	87	87	85	87	88	89	73	91	73	79	79	80	68	69	73	77	81	82	89
54	1263218	70	72	103	99	93	99	93	93	89	85	89	87	91	-	-	93	97	93	95	92	90	92
55	1192412	70	74	83	87	86	89	88	89	83	87	103	81	81	-	-	101	96	93	93	88	83	88
56	1263260	68	70	83	90	93	93	92	94	92	97	95	93	103	83	97	73	83	75	78	79	81	81
57	1193396	70	76	90	90	89	86	83	90	84	76	115	87	84	-	-	87	103	97	98	107	89	92
58	1263004	52	54	73	77	81	89	76	71	66	62	87	83	90	-	-	88	86	84	75	76	67	66
59	1268724	72	70	95	83	87	84	85	97	96	97	108	100	101	98	-	117	93	83	89	82	83	81
60	113738	74	70	97	100	102	105	107	106	104	104	107	87	100	-	-	114	86	79	89	89	88	83
61	1259517	90	78	97	101	102	103	105	105	101	94	118	108	86	103	-	107	113	108	101	93	98	91
62	1179528	86	86	83	87	87	92	99	94	93	75	82	84	95	-	-	105	106	103	97	101	97	97
63	1271567	60	64	87	76	71	81	84	87	87	84	77	73	80	79	83	70	64	69	72	76	73	76
64	1284184	84	90	100	105	101	100	101	105	103	100	109	112	103	101	-	99	97	95	93	96	100	103
65	385964	68	70	107	101	99	101	98	99	97	92	94	111	86	92	-	79	74	77	79	81	81	81
66	1224058	74	76	107	107	103	107	105	101	101	97	95	113	103	101	-	103	105	100	97	97	94	96
67	1287796	74	76	96	99	100	98	100	106	106	97	105	95	84	101	-	101	98	101	100	93	89	94
68	1250162	74	70	83	87	85	87	87	89	92	88	92	101	95	-	-	92	91	89	85	87	83	83
69	182550	74	72	83	87	84	87	85	90	86	85	101	93	85	-	-	90	90	95	92	91	91	90
70	1214417	68	70	98	100	98	87	94	101	93	80	111	107	87	-	-	93	83	75	72	77	87	87
71	1293879	80	70	101	93	95	93	94	93	93	76	90	93	87	-	-	83	80	90	73	63	90	87
72	1228202	70	70	90	90	83	83	87	82	77	83	100	80	80	80	-	100	93	89	83	73	81	87
73	80791	80	70	107	100	100	100	103	93	99	79	61	93	87	89	95	97	87	83	91	87	91	87
74	520367	78	70	87	93	95	96	92	92	94	79	100	89	66	-	-	97	87	95	94	95	92	83
75	1281588	80	90	97	97	97	97	97	99	105	83	103	93	83	-	-	93	97	93	88	83	88	103
76	491545	88	90	113	115	113	112	117	105	111	100	117	109	94	95	-	125	115	103	108	117	105	106
77	1283085	80	60	103	98	98	103	102	97	98	85	113	93	99	-	-	100	83	93	85	90	93	73
78	1297359	70	70	70	77	79	77	75	77	76	73	76	98	103	98	-	83	86	87	86	88	85	84
79	1298412	70	74	100	100	93	97	93	95	92	83	96	98	77	85	-	95	83	99	97	94	92	95
80	1261280	74	70	83	86	84	83	87	81	85	83	85	87	79	82	-	87	89	86	89	84	85	86
81	806762	74	70	83	86	85	91	87	93	89	78	91	90	92	86	-	85	87	83	81	81	85	83
82	1299588	80	80	100	95	83	89	85	85	83	87	86	100	79	85	-	89	89	82	76	83	95	93
83	990732	64	70	106	110	103	103	104	98	99	91	97	97	87	-	-	83	89	87	87	89	73	80
84	1288666	70	72	103	95	100	100	73	95	92	89	97	87	97	93	-	91	83	89	83	86	83	83
85	1296528	70	70	90	91	87	88	93	82	93	86	90	77	67	-	-	97	99	96	83	89	84	83
86	699572	90	90	103	103	97	93	86	95	87	86	93	91	115	-	-	87	95	89	93	93	103	103
87	1310928	76	70	100	104	97	98	103	103	87	95	106	76	77	76	-	83	90	85	89	87	88	87
88	1311695	70	74	93	89	91	87	86	87	93	87	95	93	99	91	95	86	79	87	86	86	84	88
89	1317866	70	68	83	87	86	88	93	88	93	83	73	93	83	84	-	103	93	93	79	73	85	82
90	1312925	70	74	73	77	77	76	73	71	79	73	89	101	97	-	-	94	91	91	93	87	83	93
91	529302	70	72	94	94	94	90	93	93	93	83	102	95	88	89	77	93	89	83	92	75	80	85
92	1309979	76	80	89	93	93	95	99	90	91	89	90	93	83	95	103	109	103	103	103	96	92	93
93	1310324	80	70	93	97	95	98	97	95	95	70	85	73	77	83	-	106	99	83	73	81	89	82
94	1318475	70	74	90	92	91	83	85	95	93	88	105	95	83	97	95	101	73	93	92	96	83	87
95	1318080	80	88	127	133	134	126	126	123	128	107	137	133	96	93	-	125	125	122	119	117	109	117
96	1317673	80	80	103	110	108	97	101	97	101	100	116	98	96	-	-	83	100	101	94	98	93	93
97	1334788	70	70	87	92	89	92	94	93	91	92	86	103	97	95	98	-	83	89	88	89	88	84
98	1319275	80	70	103	99	101	95	94	98	93	98	113	87	97	90	-	100	104	97	88	83	96	90
99	1319459	70	60	117	119	117	115	107	105	108	101	120	100	80	-	-	133	115	103	93	86	89	85
100	1319713	80	70	107	112	113	113	111	107	100	85	105	93	91	-	-	107	103	98	97	90	93	83

S. no	MRD no.	SPO2_Baseline	SPO2_During nebulisation	SPO2_5 min	SPO2_10 min	SPO2_after nebulisation	SPO2_5 min	SPO2_10 min	SPO2_Before intubation	SPO2_After intubation	SPO2_Intraoperatively 0 hr	SPO2_ 1 hr	SPO2_ 2 hr	SPO2_ 3 hr	SPO2_Postop 0 hr	SPO2_ 1 hr	SPO2_ 2 hr	SPO2_ 4 hr	SPO2_ 8 hr	SPO2_1 2 hr	SPO2_ 24 hr
51	1257886	96	97	98	98	99	98	99	100	100	100	100	100	100	98	96	94	95	96	97	98
52	1262371	98	97	98	99	99	98	98	100	100	99	98	-	-	98	99	98	99	98	99	98
53	1262257	97	98	99	99	99	98	99	100	100	100	100	100	100	97	96	95	97	99	99	98
54	1263218	98	99	98	99	98	99	98	99	100	99	98	-	-	100	100	99	98	99	98	99
55	1192412	98	97	96	98	98	99	97	98	100	100	100	-	-	98	98	98	99	99	99	99
56	1263260	97	98	99	100	100	99	98	100	100	100	100	100	98	99	97	98	99	99	99	99
57	1193396	97	98	99	100	99	99	99	100	100	100	100	-	-	94	94	94	98	96	96	98
58	1263004	98	99	98	98	99	99	99	99	100	100	100	-	-	96	97	99	99	99	99	100
59	1268724	95	96	97	98	99	99	99	99	99	100	99	100	-	98	97	97	96	96	97	98
60	113738	100	99	100	100	100	100	100	100	100	100	100	-	-	100	100	100	100	99	100	100
61	1259517	99	99	99	98	99	100	100	100	100	100	100	100	-	98	98	98	98	98	98	98
62	1179528	99	99	99	99	99	99	99	99	99	99	100	-	-	98	98	98	98	98	98	98
63	1271567	98	99	98	99	98	98	99	100	100	100	100	100	100	99	99	98	99	99	98	98
64	1284184	100	98	99	98	99	99	99	100	100	100	100	100	-	99	99	97	98	99	99	99
65	385964	100	100	99	98	99	98	98	98	98	100	98	98	-	99	98	99	98	98	99	98
66	1224058	98	98	98	98	98	97	98	100	100	100	100	100	-	97	98	98	97	96	97	98
67	1287796	96	97	97	97	99	99	99	100	100	100	100	100	-	99	98	97	98	99	98	97
68	1250162	96	97	97	98	98	99	98	100	100	100	100	-	-	99	98	97	97	97	98	98
69	182550	99	98	99	98	99	99	98	99	99	100	98	-	-	98	97	97	97	97	98	97
70	1214417	97	98	97	97	98	97	98	99	100	100	100	-	-	99	98	99	99	99	99	98
71	1293879	100	100	100	100	100	100	100	100	100	100	100	-	-	96	95	96	97	97	98	97
72	1228202	99	99	100	100	100	100	100	100	100	100	100	100	-	100	100	100	100	98	99	98
73	80791	98	99	100	100	100	99	98	99	99	100	100	100	99	100	100	99	98	100	100	100
74	520367	100	99	98	99	98	99	98	99	100	100	100	-	-	98	98	99	100	99	98	99
75	1281588	98	99	98	100	100	100	100	100	100	100	100	-	-	96	96	98	99	99	100	99
76	491545	98	98	100	100	100	100	100	99	100	100	100	100	-	96	95	94	96	95	97	97
77	1283085	98	99	99	100	100	99	100	100	100	100	100	-	-	96	97	97	98	97	98	98
78	1297359	99	98	99	99	98	99	98	99	99	100	100	100	-	98	99	99	98	99	98	99
79	1298412	98	99	98	99	99	98	98	100	100	100	100	100	-	99	99	99	98	98	98	98
80	1261280	98	99	98	99	99	99	98	99	99	100	100	100	-	99	99	99	99	98	98	99
81	806762	100	99	98	99	99	98	99	100	100	100	100	100	-	99	99	99	98	99	99	99
82	1299588	99	98	99	99	99	99	98	100	100	100	100	100	-	98	99	97	96	98	99	98
83	990732	98	99	98	98	99	99	98	99	99	100	100	-	-	98	97	97	97	98	97	98
84	1288666	98	98	98	99	99	98	99	100	100	100	100	100	-	99	99	98	99	99	98	99
85	1296528	98	99	99	99	99	99	99	100	100	100	100	-	-	99	99	98	99	99	99	98
86	699572	99	99	98	98	99	100	99	99	99	100	100	-	99	98	99	98	98	98	98	98
87	1310928	98	100	99	99	99	98	99	100	100	100	100	100	-	100	100	100	100	99	99	99
88	1311695	98	99	100	100	99	98	99	100	100	100	100	100	100	99	98	98	98	98	99	99
89	1317866	98	99	98	99	98	98	99	98	98	100	100	100	-	98	98	97	96	97	97	98
90	1312925	99	98	99	98	97	98	99	99	100	100	100	-	-	98	96	97	98	99	99	98
91	529302	98	99	98	99	98	99	99	99	100	99	98	99	100	98	98	97	98	98	98	98
92	1309979	98	99	100	100	99	99	99	100	100	100	100	100	100	98	99	95	96	98	99	99
93	1310324	93	95	96	95	96	95	95	99	98	98	98	96	-	94	95	94	94	95	96	96
94	1318475	98	99	100	100	98	97	96	100	100	100	100	100	100	97	98	97	97	96	97	99
95	1318080	99	99	100	100	99	99	99	100	100	100	100	100	-	100	100	100	100	100	100	100
96	1317673	99	100	99	98	100	99	98	100	100	100	100	-	-	100	99	99	99	98	99	98
97	1334788	83	99	100	100	99	99	98	99	99	100	100	100	-	99	99	99	98	99	99	99
98	1319275	93	95	95	96	97	95	95	100	100	100	100	100	-	98	97	97	96	97	98	99
99	1319459	94	95	95	97	97	95	95	98	100	100	100	-	-	100	100	100	100	100	100	100
100	1319713	98	99	98	99	98	99	99	100	100	100	100	-	-	98	97	99	98	97	99	98

S. no	MRD no.	Intials	Group	Age	Sex	Name of surgery	Date of surgery	Duration of surgery	Duration of surgery(min)	Height	Weight	ASA grade	Mallampati grade	Diabetes mellitus	Hypertension	OSA	COPD	Any other	Size of endotracheal tube
101	129554	NG	2	31	M	etep	10-06-2022	3 hours	180	5'11"	93	II	III	no	yes	no	no	no	8.5
102	328795	SK	3	59	F	ETEP	13-06-2022	2hours	120	5'8"	66	III	III	no	no	no	no	post PTCA, CAD	8.5
103	1318957	SS	3	30	F	lap chole	13-06-2022	1 hour 45 min	105	5'2"	60	II	III	no	no	no	no	hypothyroidism	7.5
104	550253	RK	3	35	F	lap chole	14-06-2022	2hour 30min	150	5'2"	96	II	III	no	no	no	no	no	5.5
105	1319692	SS	2	41	M	umblical hernia repair	14-06-2022	1hour 45min	105	5'10"	83	III	III	yes	yes	no	no	CAD	8.5
106	1242966	JS	2	48	M	lap chole	15-06-2022	1 hour 30 min	90	5'7 "	61	III	III	yes	yes	no	no	cad	8.5
107	1322949	DL	1	73	F	lap chole	15-06-2022	2 hours 30 min	150	5'2"	47	III	III	yes	no	no	no	cva	7.5
108	1320134	KK	1	48	F	TAH+BSO	16-06-2022	2hours 15min	135	5'3"	67	II	III	no	no	no	no	Anaemia	7.5
109	1318796	AR	1	38	F	hydatid excision	16-06-2022	2 hour 30 min	150	5'0"	64	I	II	no	no	no	no	no	7.5
110	1325207	S	3	25	M	explo laprotomy	17-06-2022	2hours 15min	135	5'8"	65	II	III	no	no	no	no	no	7.5
111	1318318	S	3	47	F	tlh	17-06-2022	2 hour 15 min	135	4'9"	78	III	I	no	no	no	no	hypothyroidism	7.5
112	1325914	V	3	46	F	TLH+BSO	20-06-2022	2hours	120	5'2"	106	III	III	no	no	no	no	obese	7.5
113	1326226	AA	1	28	M	lap chole	20-06-2022	1hour 15min	75	5'4"	115	II	III	no	no	no	no	obese	8.5
114	1326028	KK	2	70	F	lap chole	20-06-2022	1 hour 15min	75	5'2"	65	II	II	no	no	no	no	no	7.5
115	1326828	RN	3	36	F	laprotomy and proceed	22-06-2022	3hours	180	5'4"	69	II	III	no	no	no	no	no	7.5
116	1318441	SK	3	24	M	hydatid excision	22-06-2022	3hours	180	5'6''	62	I	II	no	no	no	no	no	7.5
117	340460	TK	2	82	F	lap fundoplication	24-06-2022	3hours	180	5'1''	50	II	II	no	yes	no	no	no	7.5
118	1329313	RK	3	64	M	Lap Appendicectomy	24-06-2022	1hour15min	75	5'8''	58	I	II	no	no	no	no	no	8.5
119	1325947	S	1	75	M	lap chole	25-06-2022	3hours	180	5'5''	87	II	III	no	yes	no	no	CVA	8.5
120	1325410	BS	2	70	M	lap chole	25-06-2022	1hour	60	5'8''	70	II	I	no	yes	no	no	hep C, CVA	8.5
121	1329048	S	2	55	F	IPOM	25-06-2022	2hours30min	150	4'11''	83	III	III	yes	yes	no	no	obese	7.5
122	812053	J	1	60	M	revision bariatric surgery	25-06-2022	3hours	180	5'8''	62	III	II	no	yes	no	no	CKD	8.5
123	1324642	BD	2	80	F	lap chole	27-06-2022	1hour20min	80	5'3''	52	III	II	no	yes	no	no	bronchial asthma	7.5
124	1330276	P	1	52	M	lap chole	27-06-2022	2hour	120	5'8''	57	II	III	yes	no	no	no	no	8.5
125	682308	MS	1	37	M	PCNL	27-06-2022	1hour30min	90	5'9''	64	I	I	no	no	no	no	no	8.5
126	1330196	PR	3	65	F	lap chole	28-06-2022	2hours	120	5'3''	55	I	I	no	no	no	no	no	7.5
127	1330963	NR	2	50	M	right Nephrectomy	28-06-2022	3hours	180	5'8''	72	I	III	no	no	no	no	no	8
128	1206176	S	3	50	M	Rt Parathyroidectomy	29-06-2022	1hour 45min	105	5'9"	54	II	I	no	no	no	no	chronic pancreatitis	8
129	1331813	SK	2	73	F	umblical hernia repair	29-06-2022	2hours	120	5'3"	77	II	III	no	yes	no	no	no	7.5
130	1206176	SS	3	50	M	Rt Parathyroidectomy	29-06-2022	1hour 45min	105	5'9"	54	II	I	no	no	no	no	Ch. Pancreatitis	8
131	736430	KB	1	49	F	TLH+BSO	30-06-2022	1hour 30min	90	5'2"	86	III	II	no	yes	no	no	hypothyroidism	7.5
132	1337195	SS	1	40	M	explo laprotomy	07-07-2022	2hours 30min	150	5'10"	60	II	II	no	no	no	no	Alcoholic,opioid addict	8.5
133	1304158	RK	3	80	F	Lap chole	08-07-2022	1hour 10min	70	5'	47	III	II	yes	yes	no	no	Post PTCA	7
134	1332399	R	3	45	M	Lap chole	08-07-2022	3hours	180	6'	135	III	III	yes	yes	yes	no	no	8.5
135	1321674	BK	3	45	F	Lap chole	09-07-2022	2 hour 10 min	130	5'3"	52	III	III	no	no	no	no	no	7.5
136	1340158	H	3	45	F	etep	13-07-2022	3hours	180	5'2"	60	II	II	no	no	no	no	hypothyroidism	7.5
137	1339683	N	1	42	F	Lap chole	13-07-2022	1hour 30min	90	5'3"	101	III	III	yes	no	no	no	post covid, hypothyroid	7.5
138	1335805	RK	1	19	F	septoturbinoplasty	14-07-2022	2hours	120	5'7"	52	I	II	no	no	no	no	no	7
139	1265804	NR	2	50	F	Renal transplant donor	14-07-2022	3hours	180	5'2"	78	III	II	no	no	no	no	bronchial asthma	7.5
140	1341247	US	3	78	M	Lap chole+hernia repair	15-07-2022	3hours	180	5'6"	56	II	II	no	no	no	no	smoker	8
141	1343819	KD	2	73	F	Diagnostic lap+proceed	19-07-2022	2hours	120	5'	48	III	II	no	no	no	no	CAD	7.5
142	1343903	KP	3	46	F	TLH	19-07-2022	2hours30min	150	5'3"	92	III	I	no	yes	no	no	hypothyroidism	7.5
143	1301844	BB	1	70	M	Lap chole	19-07-2022	2hours 15min	135	5'8"	55	II	II	yes	yes	no	no	smoker, alcoholic	8
144	1345603	JS	1	30	M	Lap Appendicectomy	22-07-2022	1hour10min	70	5'11	135	III	III	no	yes	no	no	Obese	8.5
145	1347062	S	2	20	M	Lap chole	25-07-2022	2 hours	120	5'10"	77	I	II	no	no	no	no	no	8.5
146	1347040	T	1	50	M	fb aspiration hypopharynx	26-07-2022	1 hour	60	6'	70	III	III	yes	yes	no	no	chronic alcoholic	8.5
147	1347773	ML	1	69	M	ETEP	26-07-2022	3hours	180	5'7"	70	II	III	no	no	no	no	CAD	8.5
148	1337490	D	1	35	F	Scalp sebaceous cyst excision	27-07-2022	2 hour	120	5'3"	69	I	I	no	no	no	no	no	7.5
149	1372292	S	3	49	M	laproscopy and proceed	02-09-2022	2hours	120	5'7"	90	II	III	no	no	no	no	obese	8
150	1370444	A	2	20	F	septoplasty	01-09-2022	2hours	120	5'5"	47	I	II	no	no	no	no	no	7

S. no	MRD no.	No. of attempts in insertion of ETT	Cuff pressure_ 0 hr	Cuff pressure_ 1 hr	Cuff pressure_ 2 hr	Cuff pressure_ 3 hr	Sore throat grade _0 hr	Sore throat grade _1 hr	Sore throat grade _2 hr	Sore throat grade _4 hr	Sore throat grade _8 hr	Sore throat grade _12 hr	Sore throat grade _24 hr	Cough grade _0 hr	Cough grade _1 hr	Cough grade _2 hr	Cough grade _4 hr	Cough grade _8 hr	Cough grade _12 hr	Cough grade _24 hr	Hoarseness grade _0 hr
101	129554	1	28	30	24	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
102	328795	1	28	20	24	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
103	1318957	1	26	30	-	-	1	1	1	0	0	0	0	0	0	0	0	0	0	0	2
104	550253	1	30	28	32	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
105	1319692	1	24	30	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
106	1242966	1	26	28	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
107	1322949	1	28	30	32	-	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1
108	1320134	1	30	26	20	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
109	1318796	1	28	24	26	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	1325207	1	24	28	36	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111	1318318	1	32	30	26	-	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0
112	1325914	1	28	26	20	-	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0
113	1326226	1	24	20	26	-	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
114	1326028	1	25	28	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
115	1326828	1	28	26	20	24	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
116	1318441	1	26	24	28	20	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
117	340460	1	24	20	28	26	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
118	1329313	1	28	20	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
119	1325947	1	20	26	28	-	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0
120	1325410	1	26	20	-	-	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
121	1329048	1	24	26	28	-	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
122	812053	1	24	28	26	20	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
123	1324642	1	22	26	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
124	1330276	1	25	29	26	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
125	682308	1	24	20	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
126	1330196	1	28	20	24	-	1	1	1	0	0	0	0	0	0	0	0	0	0	0	2
127	1330963	1	24	28	22	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
128	1206176	1	28	26	-	-	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0
129	1331813	1	24	20	26	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
130	1206176	1	28	26	-	-	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0
131	736430	1	38	26	-	-	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0
132	1337195	1	24	26	20	-	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0
133	1304158	1	28	24	-	-	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1
134	1332399	1	26	28	30	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
135	1321674	1	36	20	28	-	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0
136	1340158	1	24	20	26	22	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0
137	1339683	1	28	26	-	-	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
138	1335805	1	26	28	20	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
139	1265804	1	32	28	25	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	1341247	1	32	26	24	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
141	1343819	1	28	24	20	-	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0
142	1343903	1	26	24	28	-	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
143	1301844	1	28	26	25	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
144	1345603	1	24	28	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
145	1347062	1	20	28	26	-	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
146	1347040	1	28	25	-	-	2	2	2	1	1	1	1	0	0	0	0	0	0	0	0
147	1347773	1	26	28	24	26	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0
148	1337490	1	28	25	20	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
149	1372292	1	22	26	24	-	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
150	1370444	1	26	28	24	-	2	2	2	1	1	0	0	0	0	0	0	0	0	0	0

S. no	MRD no.	Hoarseness grade _1 hr	Hoarseness grade _2 hr	Hoarseness grade _4 hr	Hoarseness grade _8 hr	Hoarseness grade _12 hr	Hoarseness grade _24 hr	Pain grade _0 hr	Pain grade _1 hr	Pain grade _2 hr	Pain grade _4 hr	Pain grade _8 hr	Pain grade _12 hr	Pain grade _24 hr	HR_Baseline	HR_During nebulisation	HR_5 min	HR_10 min	HR_after nebulisation	HR_5 min	HR_10 min	HR_Before intubation	HR_After intubation
101	129554	0	0	0	0	0	0	0	0	0	0	0	0	0	82	84	85	86	84	82	80	78	96
102	328795	2	1	1	0	0	0	1	1	0	0	0	0	0	62	64	62	68	66	64	68	76	98
103	1318957	2	2	1	1	0	0	0	0	0	0	0	0	0	105	104	108	106	100	102	109	118	112
104	550253	0	0	0	0	0	0	2	2	1	0	0	0	0	78	82	80	76	79	84	82	80	79
105	1319692	0	0	0	0	0	0	0	0	0	0	0	0	0	88	86	84	88	89	83	85	72	108
106	1242966	1	1	1	0	0	0	0	0	0	0	0	0	0	125	124	128	126	122	124	128	118	132
107	1322949	1	1	1	0	0	0	0	0	0	0	0	0	0	78	76	74	72	73	75	76	78	76
108	1320134	0	0	0	0	0	0	0	0	0	0	0	0	0	98	96	97	94	95	96	95	84	104
109	1318796	0	0	0	0	0	0	0	0	0	0	0	0	0	78	76	79	82	84	75	84	66	99
110	1325207	0	0	0	0	0	0	0	0	0	0	0	0	0	110	112	114	108	109	114	112	104	128
111	1318318	0	0	0	0	0	0	0	0	0	0	0	0	0	76	78	79	78	74	75	80	68	99
112	1325914	0	0	0	0	0	0	0	0	0	0	0	0	0	100	104	102	101	98	99	98	99	108
113	1326226	0	0	0	0	0	0	0	0	0	0	0	0	0	84	85	86	84	85	85	86	87	84
114	1326028	0	0	0	0	0	0	0	0	0	0	0	0	0	84	85	86	88	87	84	85	88	106
115	1326828	0	0	0	0	0	0	0	0	0	0	0	0	0	84	82	80	80	78	76	78	79	110
116	1318441	0	0	0	0	0	0	4	4	4	2	2	2	2	78	76	78	74	72	70	76	72	88
117	340460	0	0	0	0	0	0	6	6	6	2	2	1	1	68	69	74	70	69	64	68	76	82
118	1329313	0	0	0	0	0	0	0	0	0	0	0	0	0	80	82	84	80	85	86	84	78	90
119	1325947	0	0	0	0	0	0	0	0	0	0	0	0	0	88	86	84	80	82	80	84	82	86
120	1325410	0	0	0	0	0	0	0	0	0	0	0	0	0	60	64	64	66	68	68	64	65	78
121	1329048	0	0	0	0	0	0	0	0	0	0	0	0	0	100	98	98	99	99	98	99	88	108
122	812053	0	0	0	0	0	0	0	0	0	0	0	0	0	90	94	93	92	90	88	89	78	88
123	1324642	0	0	0	0	0	0	0	0	0	0	0	0	0	80	82	83	84	85	86	86	78	89
124	1330276	0	0	0	0	0	0	0	0	0	0	0	0	0	80	84	82	86	84	82	83	80	92
125	682308	0	0	0	0	0	0	0	0	0	0	0	0	0	65	66	64	60	68	62	60	58	87
126	1330196	2	2	1	1	1	1	4	4	4	2	2	2	2	92	90	89	84	80	86	88	84	90
127	1330963	0	0	0	0	0	0	0	0	0	0	0	0	0	92	94	92	93	92	92	89	72	90
128	1206176	0	0	0	0	0	0	4	4	4	3	3	2	2	79	78	76	74	76	75	78	60	88
129	1331813	1	1	1	1	0	0	0	0	0	0	0	0	0	84	80	84	86	84	80	84	80	88
130	1206176	0	0	0	0	0	0	4	4	4	3	3	2	2	79	78	76	74	76	75	78	60	88
131	736430	0	0	0	0	0	0	0	0	0	0	0	0	0	84	85	86	88	87	89	85	87	104
132	1337195	0	0	0	0	0	0	0	0	0	0	0	0	0	98	99	98	90	96	94	95	82	118
133	1304158	1	1	0	0	0	0	0	0	0	0	0	0	0	70	74	75	76	75	76	78	76	112
134	1332399	2	2	1	1	1	1	4	4	3	3	4	1	1	68	67	66	64	65	66	65	56	98
135	1321674	0	0	0	0	0	0	0	0	0	0	0	0	0	114	112	116	115	117	108	110	74	92
136	1340158	0	0	0	0	0	0	0	0	0	0	0	0	0	98	97	98	98	94	95	96	88	94
137	1339683	0	0	0	0	0	0	3	3	3	2	2	1	1	82	83	84	85	86	88	86	80	99
138	1335805	0	0	0	0	0	0	5	5	4	4	2	2	1	95	94	92	90	89	88	87	88	98
139	1265804	0	0	0	0	0	0	0	0	0	0	0	0	0	96	94	95	96	97	98	99	94	104
140	1341247	0	0	0	0	0	0	4	4	3	2	1	1	1	90	94	92	91	90	89	88	84	86
141	1343819	0	0	0	0	0	0	0	0	0	0	0	0	0	98	98	94	95	98	96	94	82	106
142	1343903	0	0	0	0	0	0	0	0	0	0	0	0	0	106	98	94	95	96	98	99	94	86
143	1301844	0	0	0	0	0	2	2	2	1	1	1	1	1	64	66	64	67	68	67	68	56	78
144	1345603	0	0	0	0	0	0	0	0	0	0	0	0	0	89	88	84	86	85	84	80	76	87
145	1347062	0	0	0	0	0	0	0	0	0	0	0	0	0	114	112	110	112	108	112	110	98	112
146	1347040	0	0	0	0	0	0	2	2	2	1	1	0	0	90	89	88	89	88	86	87	86	88
147	1347773	0	0	0	0	0	0	0	0	0	0	0	0	0	64	66	68	64	60	66	62	65	72
148	1337490	0	0	0	0	0	0	4	4	4	3	1	1	1	84	85	88	86	85	84	80	78	114
149	1372292	0	0	0	0	0	0	0	0	0	0	0	0	0	84	84	80	85	86	84	85	76	88
150	1370444	0	0	0	0	0	0	0	0	0	0	0	0	0	78	74	70	76	78	74	75	70	82

S. no	MRD no.	HR_Intraoperatively 0 hr	HR_1 hr	HR_2 hr	HR_3 hr	HR_Postop 0 hr	HR_ 1 hr	HR_ 2 hr	HR_ 4 hr	HR_ 8 hr	HR_1 2 hr	HR_24 hr	SBP_Baseline	SBP_During nebulisation	SBP_5 min	SBP_10 min	SBP_after nebulisation	SBP_5 min	SBP_10 min	SBP_Before intubation	SBP_After intubation	SBP_Intraoperatively 0 hr	SBP_ 1 hr	SBP_ 2 hr	SBP_ 3 hr
101	129554	60	80	78	82	106	94	92	90	88	87	80	120	124	126	128	127	120	124	120	148	124	110	114	120
102	328795	70	68	80	-	88	86	84	82	80	76	72	150	150	148	146	138	144	150	148	168	140	120	136	-
103	1318957	110	80	-	-	118	106	98	102	94	92	90	110	112	116	118	120	124	118	98	130	120	122	-	-
104	550253	78	84	82	-	84	83	82	84	85	84	80	130	126	124	120	128	126	124	120	126	120	122	124	-
105	1319692	80	84	-	-	88	89	78	76	75	82	84	140	142	144	146	150	148	146	104	149	130	120	-	-
106	1242966	120	124	-	-	134	130	128	124	120	122	126	170	174	176	170	178	175	174	160	188	150	180	-	-
107	1322949	78	80	82	-	104	98	88	80	76	74	83	150	148	146	144	152	150	146	100	160	140	130	120	-
108	1320134	80	84	62	-	84	88	86	87	88	90	88	130	134	136	138	146	128	134	136	112	150	118	110	-
109	1318796	80	70	82	-	86	84	80	78	82	86	76	118	116	120	114	115	120	124	112	136	110	120	114	-
110	1325207	100	104	98	-	118	112	114	100	108	120	110	130	134	130	124	128	126	128	126	124	120	116	118	-
111	1318318	98	80	74	-	88	86	84	80	76	74	78	117	124	122	126	126	118	116	108	150	140	122	134	-
112	1325914	98	86	74	-	114	118	88	84	99	98	86	130	124	120	120	120	114	116	108	148	140	124	130	-
113	1326226	90	84	-	-	99	94	80	82	80	86	84	120	126	120	112	118	120	118	110	128	124	120	-	-
114	1326028	98	92	-	-	114	102	88	84	82	86	86	150	148	148	146	146	148	152	128	142	128	136	-	-
115	1326828	120	86	118	82	80	78	79	80	84	82	80	110	110	114	112	110	114	112	110	132	124	118	100	106
116	1318441	80	78	76	84	82	80	84	86	85	83	84	120	124	126	120	120	124	122	110	130	124	132	128	120
117	340460	64	66	68	64	78	69	68	68	76	74	72	140	140	138	134	126	134	130	132	156	154	146	132	136
118	1329313	84	80	-	-	85	84	82	83	80	78	79	130	124	126	128	130	134	136	124	128	110	114	-	-
119	1325947	80	74	102	88	84	80	82	81	78	76	78	130	130	130	128	126	126	128	106	128	120	124	122	118
120	1325410	68	94	-	-	98	94	86	84	85	84	82	110	114	115	116	118	110	108	114	124	120	114	-	-
121	1329048	99	98	86	-	94	90	86	88	86	87	84	150	148	146	146	146	148	150	146	168	168	146	142	-
122	812053	80	74	82	78	76	77	76	75	74	73	72	146	144	140	145	140	140	138	134	140	130	124	118	126
123	1324642	80	84	-	-	88	87	86	84	85	86	88	132	130	134	130	132	130	132	124	148	145	136	-	-
124	1330276	84	82	83	-	84	82	83	82	80	78	79	170	174	170	168	169	174	170	164	172	174	140	136	-
125	682308	82	66	-	-	68	64	66	68	66	67	68	130	124	120	124	120	122	118	92	124	110	114	-	-
126	1330196	82	88	82	-	92	90	88	84	82	80	87	116	118	116	117	120	122	117	107	138	132	124	120	-
127	1330963	74	78	81	68	67	68	66	64	66	65	66	122	120	120	118	124	126	124	118	148	140	100	126	120
128	1206176	88	82	-	-	94	88	86	84	80	78	86	126	120	124	125	128	126	124	110	130	140	128	-	-
129	1331813	82	80	86	-	90	92	88	88	86	89	94	130	128	124	120	118	120	116	98	140	142	130	136	-
130	1206176	88	82	-	-	94	88	86	84	80	78	80	126	120	124	125	128	126	124	110	130	142	128	-	-
131	736430	82	100	-	-	94	90	88	86	84	85	86	140	130	134	136	138	134	130	126	156	140	128	-	-
132	1337195	104	106	108	-	114	98	98	99	96	94	96	110	114	116	118	114	120	118	116	108	88	124	108	-
133	1304158	90	84	-	-	108	104	98	96	88	78	76	118	116	118	120	124	118	116	112	134	120	140	-	-
134	1332399	80	80	84	86	74	68	66	60	58	54	55	150	147	146	144	140	138	154	112	158	158	124	120	124
135	1321674	80	104	110	-	118	99	90	84	88	89	88	110	112	114	116	117	104	116	100	130	120	130	124	-
136	1340158	86	68	64	69	78	78	74	62	86	88	84	140	138	134	130	124	120	126	108	140	118	124	120	116
137	1339683	80	68	-	-	87	84	85	89	88	86	78	128	126	120	126	120	128	120	110	138	140	144	-	-
138	1335805	84	82	86	-	84	87	88	86	88	88	84	100	104	107	108	98	99	100	102	114	110	114	107	-
139	1265804	96	98	110	94	88	86	84	85	83	82	81	136	134	135	135	136	137	138	130	148	146	142	144	146
140	1341247	104	98	94	92	90	89	88	86	84	82	80	102	108	104	110	117	112	110	108	128	90	100	96	106
141	1343819	100	84	96	-	94	98	96	84	90	92	90	150	148	146	145	146	140	138	134	130	144	120	124	-
142	1343903	68	66	72	-	84	80	86	84	82	80	78	130	124	120	116	136	134	128	138	130	140	124	120	-
143	1301844	78	74	76	-	88	82	74	68	69	70	66	124	126	120	124	120	126	124	100	136	121	124	126	-
144	1345603	98	94	-	-	98	94	95	98	88	87	88	180	184	180	178	176	174	176	170	174	164	160	-	-
145	1347062	110	104	98	-	94	98	96	96	90	92	90	134	130	130	136	138	138	140	136	132	140	124	120	-
146	1347040	84	80	-	-	84	86	85	84	82	80	82	138	136	136	130	134	130	126	120	120	140	124	-	-
147	1347773	52	60	64	62	50	56	58	56	54	52	56	124	120	124	120	124	120	124	120	124	120	110	114	128
148	1337490	106	100	88	-	108	90	88	86	84	80	84	138	136	138	138	138	140	138	110	142	130	114	120	-
149	1372292	70	72	78	-	64	70	72	73	75	68	64	90	94	95	99	98	100	98	106	108	104	108	109	-
150	1370444	84	82	80	-	92	90	84	82	80	76	78	124	120	124	124	120	116	117	110	128	124	120	118	-

S. no	MRD no.	SBP_Postop 0 hr	SBP_ 1 hr	SBP_ 2 hr	SBP_ 4 hr	SBP_ 8 hr	SBP_1 2 hr	SBP_ 24 hr	DBP_Baseline	DBP_During nebulisation	DBP_5 min	DBP_10 min	DBP_after nebulisation	DBP_5 min	DBP_10 min	DBP_Before intubation	DBP_After intubation	DBP_Intraoperatively 0 hr	DBP_ 1 hr	DBP_ 2 hr	DBP_ 3 hr	DBP_Postop 0 hr	DBP_ 1 hr	DBP_ 2 hr	DBP_ 4 hr	DBP_ 8 hr
101	129554	144	130	132	136	130	128	128	86	70	80	78	76	70	80	80	100	80	70	60	72	75	76	84	68	70
102	328795	148	140	130	130	140	136	134	80	80	76	70	80	70	70	76	80	70	66	70	-	86	80	76	70	70
103	1318957	130	114	120	124	110	100	102	70	74	70	74	80	72	80	60	90	70	74	-	-	70	80	70	78	70
104	550253	130	124	130	134	132	130	134	80	70	78	80	74	70	70	80	78	80	74	80	-	70	70	80	79	78
105	1319692	100	110	120	124	120	130	128	80	78	86	88	90	80	70	80	100	80	60	-	-	70	72	80	84	80
106	1242966	160	180	170	168	155	164	150	100	90	94	90	98	90	100	100	110	100	100	-	-	110	120	100	100	99
107	1322949	136	124	126	128	120	116	110	80	80	88	80	88	79	80	70	70	80	82	78	-	88	70	82	80	80
108	1320134	122	126	128	126	128	130	120	80	86	80	84	82	80	84	84	80	78	70	64	-	70	74	70	72	76
109	1318796	120	124	118	112	110	100	90	78	80	80	74	70	84	80	60	88	70	60	64	-	88	70	80	78	70
110	1325207	120	124	130	134	140	110	130	80	80	80	84	80	78	70	80	76	90	80	84	-	80	86	88	100	90
111	1318318	130	124	104	108	110	120	124	74	70	80	85	80	70	78	82	85	70	90	80	-	78	80	88	70	78
112	1325914	124	118	112	110	110	100	108	90	86	80	80	80	80	74	68	100	94	76	80	-	76	70	74	70	70
113	1326226	130	120	120	118	110	110	108	80	76	70	74	70	74	70	74	80	80	84	-	-	80	84	80	74	70
114	1326028	124	126	120	118	116	110	112	80	80	80	78	74	70	78	74	70	79	98	-	-	80	78	80	74	78
115	1326828	110	114	116	118	116	110	112	70	74	70	72	70	74	70	70	74	82	80	64	80	70	80	78	70	76
116	1318441	118	116	110	114	116	118	120	78	74	76	78	76	70	70	67	92	80	76	70	80	74	70	70	72	70
117	340460	152	150	164	159	150	150	140	90	90	87	80	78	82	80	78	100	110	98	84	82	80	78	70	76	90
118	1329313	124	120	125	120	124	120	124	80	78	70	72	78	80	78	70	88	64	70	-	-	74	70	76	70	76
119	1325947	132	130	126	136	124	114	108	70	70	74	70	74	74	70	68	87	80	76	70	64	84	90	84	80	82
120	1325410	126	120	124	122	120	110	114	70	74	70	74	74	70	70	74	70	76	78	-	-	82	80	78	70	80
121	1329048	160	144	140	138	136	134	130	80	82	83	84	85	86	90	94	90	94	76	72	-	84	76	70	75	70
122	812053	120	124	120	124	124	120	118	70	75	70	72	74	70	76	74	70	74	70	76	70	74	70	72	70	76
123	1324642	110	100	109	108	106	104	108	90	86	84	80	84	80	78	80	100	94	80	-	-	70	74	75	70	74
124	1330276	124	120	118	120	118	110	112	80	84	80	78	74	72	70	74	80	94	80	78	-	70	64	72	70	64
125	682308	110	114	112	107	108	106	109	90	84	80	80	78	76	70	56	92	80	74	-	-	70	74	70	74	70
126	1330196	110	108	107	108	110	117	118	80	74	78	70	74	70	82	68	69	80	76	70	-	70	74	70	74	70
127	1330963	110	100	114	110	114	108	109	84	80	84	80	76	70	70	72	92	80	72	70	72	70	74	76	70	70
128	1206176	140	136	110	90	120	118	120	76	74	70	72	76	75	78	75	80	80	78	-	-	70	60	70	60	70
129	1331813	130	124	120	118	116	110	124	80	70	76	70	74	70	78	68	70	80	78	80	-	76	70	72	70	72
130	1206176	140	136	110	90	120	118	120	76	74	70	72	76	75	78	75	80	80	78	-	-	70	60	70	60	70
131	736430	136	138	118	112	124	130	130	80	78	86	84	88	84	80	84	80	90	88	-	-	84	86	74	70	88
132	1337195	110	114	112	110	114	112	110	70	74	70	76	70	70	74	70	74	40	80	76	-	70	76	70	70	74
133	1304158	138	112	114	110	100	104	108	67	70	74	70	70	74	70	68	98	64	78	-	-	80	82	86	76	68
134	1332399	122	120	118	114	110	100	112	80	84	85	80	86	84	85	88	90	70	74	60	64	66	74	70	72	70
135	1321674	140	130	124	120	122	110	114	70	74	80	78	76	70	80	60	75	80	80	84	-	90	80	76	78	70
136	1340158	118	114	118	110	108	110	108	70	76	74	70	76	70	74	70	78	64	60	76	74	70	76	70	74	70
137	1339683	110	116	112	118	116	114	112	80	76	80	84	80	84	82	76	99	80	88	-	-	70	84	80	82	78
138	1335805	110	100	98	99	98	98	99	60	64	60	68	68	64	62	60	74	60	70	74	-	70	64	60	64	68
139	1265804	144	142	146	148	136	124	130	80	85	86	88	84	85	88	98	84	80	88	90	84	80	78	88	90	86
140	1341247	130	134	132	128	110	100	108	64	66	64	65	72	74	78	70	84	60	62	65	66	74	78	80	80	70
141	1343819	132	130	134	130	128	124	126	80	78	70	74	70	70	72	76	70	78	80	84	-	80	76	78	76	70
142	1343903	138	130	134	132	130	128	128	80	84	80	78	78	70	78	70	74	80	76	70	-	78	70	76	78	70
143	1301844	148	120	116	118	114	120	124	67	68	70	78	80	76	70	62	89	82	80	84	-	70	80	70	78	70
144	1345603	168	166	184	180	176	170	180	100	110	100	102	100	98	100	98	99	90	94	-	-	70	78	99	90	88
145	1347062	120	124	128	136	130	128	124	84	80	84	80	84	80	80	78	70	70	76	72	-	70	72	70	74	70
146	1347040	120	118	116	110	112	110	100	78	70	74	70	74	70	72	70	70	80	76	-	-	70	74	70	70	74
147	1347773	124	120	124	120	126	124	125	80	80	76	70	76	70	75	70	75	80	70	68	76	80	84	80	84	80
148	1337490	140	130	130	110	108	114	120	72	70	70	70	70	70	74	70	97	80	74	78	-	80	74	70	70	64
149	1372292	116	124	108	106	100	90	104	60	69	60	64	65	64	60	64	62	62	60	64	-	70	72	68	64	54
150	1370444	130	124	120	110	114	118	120	80	84	80	80	84	80	74	70	84	70	76	70	-	74	76	80	70	74

S. no	MRD no.	DBP_ 12 hr	DBP_ 24 hr	MAP_Baseline	MAP_During nebulisation	MAP_5 min	MAP_10 min	MAP_after nebulisation	MAP_5 min	MAP_10 min	MAP_Before intubation	MAP_After intubation	MAP_Intraoperatively 0 hr	MAP_ 1 hr	MAP_ 2 hr	MAP_ 3 hr	MAP_Postop 0 hr	MAP_ 1 hr	MAP_ 2 hr	MAP_4 hr	MAP_ 8 hr	MAP_ 12 hr	MAP_ 24 hr
101	129554	75	74	97	88	95	95	93	87	95	93	116	95	83	78	88	98	94	100	91	90	93	92
102	328795	60	68	103	103	100	95	99	95	97	96	109	93	80	90	-	107	100	94	93	93	85	90
103	1318957	70	80	83	87	85	89	93	89	93	73	103	87	90	-	-	90	91	87	93	83	80	87
104	550253	80	70	97	89	93	93	92	89	88	93	94	93	90	95	-	90	88	97	97	96	97	91
105	1319692	80	78	100	99	105	107	110	103	95	88	116	97	80	-	-	80	85	93	97	93	97	95
106	1242966	100	90	123	118	121	117	125	118	125	120	136	117	127	-	-	127	140	123	123	118	121	110
107	1322949	75	70	103	103	107	101	109	103	102	80	100	100	98	92	-	104	88	97	96	93	89	83
108	1320134	74	75	97	102	99	102	103	96	101	101	91	102	86	79	-	87	91	89	90	93	93	90
109	1318796	60	58	91	92	93	87	85	96	95	77	104	83	80	81	-	99	88	93	89	83	73	69
110	1325207	70	76	97	98	97	97	96	94	89	95	92	100	92	95	-	93	99	102	111	107	83	94
111	1318318	80	88	88	88	94	99	95	86	91	91	107	93	101	98	-	95	95	93	83	89	93	100
112	1325914	76	70	103	99	93	93	93	91	88	81	116	109	92	97	-	92	86	87	83	83	84	83
113	1326226	70	74	93	93	87	87	86	89	86	89	96	95	96	-	-	97	96	93	89	83	83	85
114	1326028	70	78	87	103	103	101	98	96	103	92	94	95	111	-	95	94	93	93	89	91	83	89
115	1326828	60	74	83	86	85	85	83	87	84	83	93	96	93	87	89	83	91	91	86	89	83	87
116	1318441	74	70	92	91	93	92	91	88	87	81	105	95	95	89	93	89	85	83	86	85	89	87
117	340460	90	72	107	107	104	98	97	103	97	96	119	125	114	100	100	104	102	101	101	110	110	95
118	1329313	70	78	97	93	89	91	96	98	97	88	101	79	85	-	-	91	87	92	87	92	87	93
119	1325947	70	89	90	90	93	89	91	91	89	81	101	93	92	87	82	100	103	98	99	96	85	95
120	1325410	70	74	83	87	85	88	89	83	83	87	88	91	90	-	-	97	93	93	87	93	83	87
121	1329048	72	70	103	104	104	105	105	107	110	111	116	119	99	95	-	109	99	93	96	92	93	90
122	812053	80	78	95	98	93	96	96	93	97	94	93	93	88	90	89	89	88	88	88	92	93	91
123	1324642	78	70	104	101	101	97	100	97	96	95	116	111	99	-	-	83	83	86	83	85	87	83
124	1330276	72	70	110	114	110	108	106	106	103	104	111	121	100	97	-	88	83	87	87	82	85	84
125	682308	74	70	103	97	93	95	92	91	86	68	103	90	87	-	-	83	87	84	85	83	85	83
126	1330196	74	70	92	89	91	86	89	87	94	81	92	97	92	87	-	83	85	82	85	83	88	86
127	1330963	72	70	97	93	96	93	92	89	88	87	111	100	81	89	88	83	83	89	83	85	84	83
128	1206176	74	78	93	89	88	90	93	92	93	87	97	100	92	-	-	93	85	83	70	87	89	92
129	1331813	70	80	97	89	92	87	89	87	91	78	93	101	95	99	-	94	88	88	86	87	83	95
130	1206176	74	78	93	89	88	90	93	92	93	87	97	100	92	-	-	93	85	83	70	87	89	92
131	736430	90	88	100	95	102	101	105	101	97	98	105	107	101	-	-	101	103	89	84	100	103	112
132	1337195	75	70	83	87	85	90	85	87	89	85	85	56	95	87	-	83	89	84	83	87	87	83
133	1304158	76	75	84	85	89	87	88	89	85	83	110	83	99	-	-	99	92	95	87	79	85	86
134	1332399	64	74	103	105	105	101	104	102	108	96	113	99	91	80	85	85	89	86	86	83	76	87
135	1321674	70	84	83	87	91	91	90	81	92	73	93	93	97	97	-	107	97	92	92	87	83	94
136	1340158	70	74	93	97	94	90	92	87	91	83	99	82	81	91	88	86	89	86	88	83	83	85
137	1339683	76	70	96	89	93	98	93	99	95	87	112	100	107	-	-	83	95	91	94	91	89	84
138	1335805	62	60	73	77	76	81	78	76	75	74	87	77	85	85	-	83	76	73	76	78	74	73
139	1265804	84	90	99	102	102	104	101	102	105	102	105	102	106	108	105	101	99	107	109	103	97	103
140	1341247	60	74	77	76	77	80	87	87	89	83	99	70	75	75	79	93	94	97	96	83	73	85
141	1343819	78	70	103	101	95	98	95	93	94	95	90	100	93	97	-	97	94	97	94	89	93	89
142	1343903	78	76	97	97	93	91	97	91	95	93	93	100	92	87	-	98	90	95	96	90	95	93
143	1301844	80	76	86	87	87	93	93	93	88	75	105	95	95	98	-	96	93	85	91	85	93	92
144	1345603	92	104	127	133	127	127	125	123	125	122	124	115	116	-	-	103	107	127	120	117	118	129
145	1347062	80	80	101	100	99	99	102	99	100	97	91	93	92	88	-	87	89	89	95	90	96	95
146	1347040	70	60	118	92	95	90	94	90	90	87	87	100	92	-	-	87	89	85	83	87	83	73
147	1347773	80	84	95	93	92	87	92	87	91	87	91	87	83	83	93	95	96	95	96	95	95	98
148	1337490	70	80	94	92	93	93	93	93	95	83	112	97	87	92	-	100	93	90	83	79	85	93
149	1372292	52	50	70	77	72	76	76	76	73	78	77	76	76	79	-	85	89	81	78	69	65	68
150	1370444	70	70	95	96	95	95	96	92	88	83	99	88	91	86	-	93	92	93	83	87	86	87

S. no	MRD no.	SPO2_Baseline	SPO2_During nebulisation	SPO2_5 min	SPO2_10 min	SPO2_after nebulisation	SPO2_5 min	SPO2_10 min	SPO2_Before intubation	SPO2_After intubation	SPO2_Intraoperatively 0 hr	SPO2_ 1 hr	SPO2_ 2 hr	SPO2_ 3 hr	SPO2_Postop 0 hr	SPO2_ 1 hr	SPO2_ 2 hr	SPO2_ 4 hr	SPO2_ 8 hr	SPO2_1 2 hr	SPO2_ 24 hr
101	129554	100	99	100	100	99	100	99	100	100	100	99	98	99	99	98	97	99	98	99	98
102	328795	99	99	98	97	98	97	96	96	100	100	100	100	-	100	98	99	98	99	98	99
103	1318957	98	99	99	100	100	100	100	100	100	100	100	-	-	97	98	98	98	99	99	97
104	550253	100	100	100	100	100	100	100	100	100	100	100	100	100	99	100	99	98	99	99	100
105	1319692	98	100	100	98	99	99	98	100	100	100	100	-	-	100	100	100	100	100	100	100
106	1242966	98	99	100	99	98	98	99	100	100	100	100	-	-	98	98	99	98	98	97	97
107	1322949	99	99	100	100	99	98	100	99	100	100	100	100	-	98	97	96	95	94	96	99
108	1320134	98	99	100	99	100	99	98	100	100	100	100	100	-	100	98	99	97	99	98	99
109	1318796	98	99	99	99	99	98	98	100	100	100	100	100	-	99	98	99	97	98	99	97
110	1325207	96	98	99	99	100	99	99	100	100	100	100	100	-	96	96	97	97	98	95	94
111	1318318	99	99	99	100	99	99	99	100	100	100	100	100	-	100	100	100	100	100	100	100
112	1325914	99	98	99	99	99	99	99	100	100	99	99	99	-	99	98	98	98	97	97	97
113	1326226	98	99	99	100	100	100	98	100	100	100	100	-	-	99	98	98	99	99	99	99
114	1326028	100	99	98	99	98	99	99	100	100	100	100	-	-	100	100	100	100	100	100	100
115	1326828	99	99	99	99	100	100	100	100	100	98	100	100	100	96	97	96	96	96	97	97
116	1318441	100	100	100	100	100	100	100	100	100	100	100	100	100	99	99	98	99	100	100	100
117	340460	99	99	100	100	98	99	98	99	100	100	100	100	100	99	99	99	99	98	98	98
118	1329313	99	99	99	100	99	98	99	100	100	100	100	-	-	99	98	99	98	98	98	98
119	1325947	94	95	96	96	97	97	95	100	100	100	100	100	100	95	95	94	95	95	95	94
120	1325410	98	98	98	99	98	99	98	99	98	100	100	-	-	100	99	98	98	99	98	98
121	1329048	96	97	98	99	99	98	98	99	98	100	100	100	-	100	100	100	99	99	99	99
122	812053	98	99	99	98	99	98	98	100	100	100	100	100	100	98	98	99	98	99	99	99
123	1324642	93	94	95	96	96	97	97	99	100	100	100	-	-	99	98	97	97	95	95	94
124	1330276	98	98	97	97	98	99	100	99	100	99	98	99	-	99	98	99	98	99	98	99
125	682308	100	99	99	98	98	98	98	100	100	100	100	-	-	99	98	97	98	99	99	99
126	1330196	98	99	98	99	99	98	98	100	100	100	100	100	-	99	98	99	99	98	99	99
127	1330963	98	99	99	99	98	99	99	100	100	100	100	100	100	98	99	98	99	99	98	99
128	1206176	98	99	98	99	97	98	99	100	100	100	100	-	-	100	99	98	99	98	97	99
129	1331813	99	99	98	99	98	99	98	99	100	100	100	100	-	98	98	97	97	98	99	98
130	1206176	98	99	98	99	97	98	99	100	100	100	100	-	-	100	99	98	99	98	97	99
131	736430	97	98	97	98	99	98	99	100	100	98	100	-	-	98	96	97	99	98	99	99
132	1337195	98	99	98	99	98	99	98	99	100	100	100	100	-	99	98	98	99	98	99	99
133	1304158	98	100	99	98	99	99	99	100	100	100	100	-	-	96	94	95	96	96	95	96
134	1332399	98	99	99	100	100	99	99	100	100	100	100	100	99	98	97	98	99	97	98	98
135	1321674	99	99	100	100	98	99	97	96	98	100	100	100	-	98	97	97	98	97	97	98
136	1340158	98	98	99	98	99	98	98	98	99	100	100	100	99	99	98	99	98	99	99	99
137	1339683	97	99	98	97	98	99	98	100	100	100	100	-	-	99	98	99	98	97	99	99
138	1335805	99	99	99	99	99	98	98	100	100	100	100	100	-	98	98	97	98	99	98	99
139	1265804	98	100	100	99	98	99	98	100	100	100	100	100	100	99	98	97	98	96	99	99
140	1341247	100	99	98	98	99	99	99	99	100	99	98	97	98	94	98	97	95	96	98	98
141	1343819	100	98	99	98	99	98	98	99	100	100	100	100	-	99	98	99	98	99	98	99
142	1343903	98	98	99	98	99	97	98	98	99	100	100	100	-	99	99	98	99	99	100	100
143	1301844	99	99	100	100	99	98	99	100	100	100	100	100	-	98	97	98	99	99	98	99
144	1345603	97	99	98	98	98	99	99	100	100	99	99	-	-	99	98	99	99	98	99	98
145	1347062	100	99	98	99	99	98	99	100	100	100	100	100	-	99	98	98	98	98	99	98
146	1347040	99	98	99	98	99	99	98	100	100	99	100	-	-	99	99	99	98	99	99	98
147	1347773	99	99	98	99	97	98	99	100	100	100	100	100	100	98	99	98	99	98	99	98
148	1337490	98	98	98	99	99	99	100	100	100	100	100	100	-	99	99	98	99	99	99	99
149	1372292	98	99	98	99	99	98	98	100	100	100	100	100	-	95	96	96	97	97	96	96
150	1370444	99	100	100	100	100	99	99	100	100	100	100	100	-	99	99	99	98	99	100	100

Baba Farid University
of Health Sciences
Sadiq Road,
Faridkot-151 203 (Pb) INDIA
Phone : 01639-256232,256236
Tele/Fax : 01639-256235
Email : Examination@bfuhs.ac.in

No. BFUHS/2K21p-TH/ 95 Date 25/1/22

The Principal,
DMC, Ludhiana.

Subject: **Approval of Plan of Thesis.**

This is to inform you that the Faculty of Medical Sciences in its meeting held on 29.10.2021 has approved the plan of thesis of **Livleen Deep Mann**, a student of your college for **MD Anaesthesiology** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis

Comparative study of nebulized dexmedetomidine and dexamethasone in preventing sore throat following endotracheal intubation.

Supervisor
Dr. Gurpreeti Kaur
Assoc. Prof.,
Dept. of Anaesthesiology,
DMCH, Ludhiana.

Co-Supervisor

Dr. Suneet Kant Kathuria
Prof.,
Dept. of Anaesthesiology,
DMCH, Ludhiana.

The student has to submit the four copies of thesis (along with PDF format) , to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She must directed to attach a photocopy of this letter with the forwarding letter while submitting thesis to the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic,(if any).

Dr. S P Singh MS(Oph)
Controller of Examinations

Note :

19. *If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.*
20. *The student may submit the thesis as per the schedule already conveyed i.e for May/June examination 30th Nov of the preceding the year of examination and for Nov/Dec examinations 31st May of the year of examination.*

COMPARATIVE STUDY OF NEBULIZED DEXMEDETOMIDINE AND DEXAMETHASONE IN PREVENTING SORE THROAT FOLLOWING ENDOTRACHEAL INTUBATION

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED

IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

DOCTOR OF MEDICINE

IN

ANAESTHESIOLOGY

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

MARCH, 2021

DR. LIVLEEN DEEP MANN

DEPARTMENT OF ANAESTHESIOLOGY
DAYANAND MEDICAL COLLEGE AND HOSPITAL
LUDHIANA

ABSTRACT OF PLAN OF THESIS

Title	COMPARATIVE STUDY OF NEBULIZED DEXMEDETOMIDINE AND DEXAMETHASONE IN PREVENTING SORE THROAT FOLLOWING ENDOTRACHEAL INTUBATION
For the degree of	M.D. Anaesthesiology
Name of the candidate	Dr. Livleen Deep Mann
Supervisor	Dr. Gurpreeti Kaur, Associate Professor, Department of Anaesthesiology
Co-supervisor	Dr. Suneet Kant Kathuria, Professor, Department of Anaesthesiology
Institution	Dayanand Medical College & Hospital, Ludhiana
University	Baba Farid University of Health Sciences, Faridkot

Introduction: Post Operative Sore Throat (POST) is a feeling of discomfort usually voiced by the patients during the postoperative recovery period following surgeries under general anaesthesia with endotracheal intubation. It causes significant agony to the patient with reported incidence of 21-71.8%. Nebulised Dexmedetomidine and Dexamethasone are being used in preventing post operative sore throat but very limited studies have been done to compare the effect of two drugs.

Aim of Study: We aim to compare the effectiveness of role of Dexmedetomidine nebulisation with Dexamethasone in attenuating Post Operative Sore Throat after general anaesthesia with endotracheal intubation.

Materials & methods: A randomized, double blind clinical study will be conducted in department of Anaesthesia , Dayanand Medical College on a total of 150 patients ≥18 years of age with ASA I –III scheduled for elective operative procedure under general anaesthesia with endotracheal intubation . The enrolled study participants will be randomised into three groups of 50 each. Group A comprising of 50 patients who will receive nebulized Dexmedetomidine 50ug (0.5 ml) with 4.5 ml of normal saline (total volume =5ml) , Group B comprising of 50 patients will receive nebulized dexamethasone 8mg (2ml) with 3 ml of normal saline(total volume=5ml) and group C will receive normal saline (total volume =5ml). Drug will be delivered using a nebulisation mask for 10 minutes. Cuff pressure will be monitored using a cuff pressure manometer. Patients will be assessed in the postoperative ward for incidence of sore throat, discomfort, pain and other side effects .

Clinical Significance: To study the effectiveness of nebulized Dexmedetomidine and Dexamethasone in reducing morbidity due to Post operative sore throat.

Keywords: Dexmedetomidine, Dexamethasone, sore throat, nebulisation

(Signature)	(Signature)	(Signature)	(Signature)
Candidate	Co-supervisor	Supervisor	Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled **"COMPARATIVE STUDY OF NEBULIZED DEXMEDETOMIDINEAND DEXAMETHASONE IN PREVENTING SORE THROAT FOLLOWING ENDOTRACHEAL INTUBATION"** exist in the Department of Anaesthesiology, DMC&H, Ludhiana and will be provided to be candidate. We will see that the data being included in the thesis are genuine and is collected by the candidate herself under our supervision and guidance.

Supervisor

Gurpreeti Kaur

Dr. Gurpreeti Kaur
Associate Professor
Department of Anaesthesiology
DMCH, Ludhiana

Co-Supervisor

Dr. Suneet Kant Kathuria
Professor
Department of Anaesthesiology
DMCH, Ludhiana

HEAD OF DEPARTMENT

Dr. Dinesh Sood
Professor & Head
Department of Anaesthesiology
DMCH, Ludhiana

Place: DMCH, Ludhiana

Date: 1/3/2021

APPROVAL PROFORMA
BY RESEARCH & ETHICAL COMMITTEE
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA

Name of candidate	DR. LIVLEEN DEEP MANN
Department	ANAESTHESIOLOGY
Topic of Thesis	COMPARATIVE STUDY OF NEBULIZED DEXMEDETOMIDINE AND DEXAMETHASONE IN PREVENTING SORE THROAT FOLLOWING ENDOTRACHEAL INTUBATION
Likely date of appearing in PG examination	MAY 2023
Date of enrollment	25 JULY, 2020
Name of Head of Department	DR. DINESH SOOD
1) Supervisor **2) Co-Supervisor**	1) DR. GURPREETI KAUR 2) DR. SUNEET KANT KATHURIA
Signature of Members of Research Committee with Stamp	**Signature of Members of Ethics Committee with Stamp**
Dr. Harpreet Kaur (Professor & Head, Pathology)	Mr. R K Sharma (Legal Expert)
Dr. Jaspal Singh (Professor & Head, Surgery)	Dr. Ramit Mahajan (Associate Professor, Gastroenterology)
Dr. Dinesh Gupta (Professor & Head, Medicine)	Dr. Anu Sharma (Professor, Anatomy)
Dr. Sandeep Kaushal (Dean Academics & Professor & Head, Pharmacology)	Dr. Sandeep Kaushal (Dean Academics & Professor & Head, Pharmacology)
Dr. Gurpreet S Wander (Vice Principal)	Dr. Gurpreet S Wander (Vice Principal & Professor & Head, Cardiology)
	Dr. Gagandeep Singh (Secretary, Ethics Committee Professor & Head, Neurology)

Approved: Yes / No

Dr. Sandeep Puri
Chairperson
Research Committee

Approved: Yes / ~~No~~

Prof. Arvind Malhotra
Chairperson
Ethics Committee

BABA FARID UNIVERSITY OF HEALTH SCIENCES,

FARIDKOT

PROFORMA FOR REGISTRATION OF SUBJECT FOR

DISSERTATION

1	NAME OF THE CANDIDATE AND ADDRESS	DR. LIVLEENDEEP MANN #23181/5 ST NO.3/9 BMD NAGAR,BATHINDA(PUNJAB)
2	NAME OF THE INSTITUTE	DAYANAND MEDICAL COLLEGE AND HOSPITAL
3	COURSE OF STUDY AND SUBJECT	MD ANAESTHESIOLOGY
4	DATE OF ADMISSION OF COURSE	25 JULY 2020
5	TITLE OF THE TOPIC	COMPARATIVE STUDY OF NEBULIZED DEXMEDETOMIDINE AND DEXAMETHASONE IN PREVENTING POST OPERATIVE SORE THROAT FOLLOWING ENDOTRACHEAL INTUBATION.

6. BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

Post Operative Sore Throat (POST) is a feeling of discomfort usually voiced by the patients during the postoperative recovery period following surgeries under general anaesthesia with endotracheal intubation. It causes significant agony to the patient bringing displeasure in recovery of anaesthesia with reported incidence of 21-71.8%.[1,2] Postoperative sore throat is a common postoperative complication experienced by patients who undergo endotracheal intubation. It results in patient dissatisfaction and may even increase hospital stay. Sore throat encompasses a wide range of conditions including pharyngitis, laryngitis, tracheitis, cough, hoarseness or dysphagia.[3]

Mucosal erosion and trauma due to endotracheal intubation, bucking and dryness of mucosa result in Post operative sore throat and hoarseness.

Factors contributing to postoperative sore throat include prolonged intubation, large sized non lubricated cuffed endotracheal tube, prolonged intubation, multiple intubation attempts ,blood and secretions causing mucosal irritation, high intracuff pressure, use of throat packs, high anesthetic gas flows and preoperative risk factors such as dry cough.[4]

The severity of Post operative sore throat is at its peak two to four hours after extubation and decreases gradually in 24 hours .The highest POST incidence is observed after tracheal intubation (14.4-50%) as compared to laryngeal mask (5.8-34%) and open mask (3.3%).[5] It is difficult to control sore throat, even when operative pain has been successfully controlled by the administration of systemic analgesics. Therefore, the prevention of post operative sore throat is an important issue. Numerous pharmacological and non pharmacological methods have been used in the past for minimising post operative sore throat with varying outcome.

Nebulisation therapy, preferable and safe method of drug delivery has been shown to be effective in POST prevention in many studies. However the relative efficacy of various nebulized agents remains unknown. Prophylactic use of nebulized corticosteroid, magnesium, ketamine can effectively prevent post operative sore throat. However additional studies with a larger sample size, better design and more detailed outcomes are recommended to derive definitive conclusions regarding the optimal dose and risk of these therapies [6] Post operative sore throat affects patient satisfaction post surgery and increases patient morbidity.

Corticosteroids are used in perioperative period to enhance the effects of analgesics and antiemetics. Dexamethasone is a potent corticosteroid with anti-inflammatory and immunosuppressant effects with role in preventing the incidence of POST.[7] Salama et al conducted a randomized controlled study to evaluate the efficacy of preoperative nebulised Dexamethasone in reducing the incidence of postextubation sore throat. A total of 120 ASA I-II patients undergoing general anesthesia. Patients were randomly assigned into one of the two groups of 60 patients each.Group D received Dexamethasone 8mg in 5ml nebulisation and group S (control group)received normal saline in 5 ml nebulisation 15 min before general anesthesia. Steroids have anti-inflammatory functions and are widely used in common practice. Inhaled corticosteroids deliver the drug to the site of actionwhere it is used in patients with airway diseases without systemic effects. They concluded that preoperative nebulisation with dexamethsone 8 mg reduces the incidence and severity of POST in patients receiving general anesthesia with endotracheal intubation.

Dexmedetomidine is alpha 2 adrenoreceptor agonist which causes sedation and analgesia. The reduction in incidence of POST is attributed to the anti inflammatory effect of Dexmedetomidine, mediated by alpha 2 receptor.[8] In 2020 Thomas et al conducted a randomized double blind comparative study of Dexmedetomidine nebulisation and Ketamine in attenuating post operative sore throat in patients undergoing thyroidectomy. Patients were randomly allocated

into two groups of 50 each; Group 1 received Ketamine 50mg (1mL) with 4mL saline nebulisation and Group 2 received Dexmedetomidine 50µg (1mL) with 4mL saline nebulisation for 15 min. General anesthesia was administered 15 min after completing nebulisation. POST monitoring was done at 0,2,4,6,12 and 24h after extubation. POST was graded on a four-point scale (0-3). They concluded that preoperative Dexmedetomidine nebulisation can be utilized as a safe and ideal alternative to Ketamine nebulisation in attenuating postoperative sore throat, with less haemodynamic derangement.

Few studies have been done on role of nebulized Dexmedetomidine in attenuating POST .Dexmedetomidine has already been used in nebulized form and being a highly lipid soluble agent, it has good systemic absorption on transmucosal administration. Nebulization therapy is widely used to prevent POST. It is highly recommended because of a small volume of drugs required for effect, easy way of administration, better patient compliance, and most importantly little risk of adverse events compared with other routes of drug administration[6]. So we plan to compare the role of dexmedetomidine nebulisation and Dexamethasone in attenuating post operative sore throat following endotracheal intubation.

6.2 REVIEW OF LITERATURE

Postoperative sore throat is experienced by patients after general anesthesia with endotracheal intubation, although considered as a relatively minor complication, may increase hospital stay and increases patient discomfort. Tracheal intubation is associated with a greater risk of postoperative sore throat than when either a supraglottic airway device or facemask is used. When inserting a tracheal tube, there may be coughing or movement due to inadequate anesthesia or neuromuscular blockade making glottic exposure difficult and airway trauma more common.[6]

Edakkattil Ramesh kumar, Pratibha Ajay kumar et al conducted study in the year 2017 on postoperative sore throat in patients undergoing head and neck surgeries under endotracheal intubation and laryngeal mask anesthesia. Total 100 subjects of age 10-79 years of both genders were included. The pain was measured as pain score during different cuff pressure and size of tube or mask and data was statistically analyzed .They concluded that postoperative sore throat can be effectively reduced by LMA .The pain score and frequency of patients with pain in the LMA group was less than that of ETT group but they were not able to find any correlation of pain score with different cuff pressure and size of tube or mask.[9]

Excessive cuff pressure can damage tracheal mucosa by direct trauma and reduction in blood flow[6]. Several studies have suggested a cuff pressure within range of 20-30 cm H2O as optimal. Even though cuff pressure manometers are now available for assessing the adequacy of cuff pressure they are not widely used as clinicians still depend on subjective methods like pilot balloon palpation or appreciation of audible air leak. However Sangeetha and Jacob et al in the year 2016, enrolled 150 ASA I–II patients who were intubated by anesthesiologists with minimum five years of experience. Cuff pressure was considered high if it was >30 cm H_2O and low if <20 cm of H_2O. The anesthesiologists were able to inflate the cuff to an optimal cuff pressure only in 64% cases. The cuff pressures were recorded as low

in 17.3% while in 18.7% of cases the cuff pressure reached above the optimal range. They concluded that even experienced anesthesiologists are not able to inflate the endotracheal cuff upto optimal cuff pressure using subjective assessment alone in all cases.[10]

Cuff pressure should be inflated to the minimum volume at which no air leak is present with positive pressure inspiration; the cuff pressure should be less than 25 cm H_2O.Excessive cuff pressure may result in tracheal mucosal injury, vocal cord dysfunction from recurrent laryngeal nerve palsy and sore throat. [11]

Kamimurab, Nakanishi et al in the year 2020 conducted a single centre propensity score-matched analysis to study the effects of the anesthesiologists experience on postoperative hoarseness after double lumen endotracheal tube intubation. They divided patients into two groups ,in one group patients were intubated by a trainee anesthesiologist with <2 years of experience and the other group comprised of patients who were intubated by senior anesthesiologist with ≥2 years of experience There was a total of 256 eligible patients of which 153 underwent intubation by trainee anesthesiologists and the remaining 103 patients were intubated by senior anesthesiologist.They concluded that the incidence of hoarseness 24 hr after surgery was significantly higher in patients who were intubated by a trainee anesthesiologist than in patients who were intubated by senior anesthesiologist [12]

In the year 2015, Salama and Badawy et al conducted a study on role of dexamethasone in decreasing the incidence of postextubation sore throat. A total of 120 patients were randomly assigned to two groups of 60 each, group D received dexamethasone 8 mg in 5 ml nebulisation and group S considered as control received normal saline in 5 ml nebulisation 15 minute before general anesthesia was induced. The incidence and severity of postoperative sore throat were graded using a four-point scale (0-3) which was significantly lower in group D than in group S at 2 hr, 4 hr, 8 hr, 12 hr and 24 hr. They concluded that preoperative nebulisation with dexamethasone 8 mg reduces the

incidence and severity of postoperative sore throat in patients receiving general anesthesia with endotracheal intubation.[13]

Paul and Gangwar et al in the year 2003, conducted a randomized, double blind comparative study over a period of 18 months to evaluate the efficacy of nebulised Budesonide and Dexamethasone in reducing postoperative sore throat in patients undergoing elective lumbar spine surgery in prone position. Patients aged 18-65 years were randomly allocated into two equal groups of 60 patients, labelled B and D, based on computer generated random sequence of numbers. Patients belonging to Group B received 500 mcg Budesonide inhalation suspensions(total volume 4ml), using a nebulizer. In Group D, 8 mg of dexamethasone in 2 ml of normal saline (total volume 4 ml) was used. They concluded that a single prophylactic preinduction nebulisation of patients undergoing elective lumbar spine surgery in prone position with Dexamethasone is better than budesonide in preventing POST. [3]

Kuriyama et al performed a systematic review and meta-analysis to assess the efficacy and safety of aerolised corticosteroids in prevention of post operative sore throat in adults undergoing tracheal intubation for surgery.[14] Nine randomized controlled trials involving 984 patients were included. Trial sequential analysis suggested that compared with non analgesic control, aerosolized corticosteroids were associated with a reduced incidence and decreased severity but the evidence for efficacy and safety was limited and not definitive.

Ashwini H and Seema Kumari et al in the year 2018, conducted a prospective double blind study to compare Dexamethasone nebulisation and Magnesium Sulphate in preventing post operative sore throat following endotracheal intubation. A total of 90 ASA I and ASA II physical status patient aged between 20 to 50 yrs scheduled for elective surgery under general anesthesia. 90 patients were allocated by simple chit picking method into two groups of 45 patients each. Group D received Dexamethasone 8mg [2ml] with 3ml of normal saline for nebulisation. Group M received $MgSO_4$ [50% W/V 2ml] with 3ml of normal saline for nebulisation 30 min before the induction of anesthesia. Patients were assessed in the postoperative ward for the

incidence of sore throat, discomfort, pain and other symptoms. They concluded that preoperative Dexamethasone nebulisation just before induction of anaesthesia is an effective method of reducing the incidence and severity of POST following endotracheal intubation and is more effective than Magnesium Sulphate.[7]

In the year 2020, Thomas et al conducted a randomized ,double blind , comparative study of Dexmedetomidine nebulisation with Ketamine in attenuating post operative sore throat in patients undergoing thyroidectomy. Patients were randomly allocated into two groups of 50 each; group 1 received Ketamine 50mg with 4ml saline nebulisation, while group 2 received Dexmedetomidine 50 ug with 4 ml saline nebulisation for 15 minutes. They found no significant difference in the incidence of POST between two groups but severity of sore throat was significantly lower in both groups. They deduced that preoperative dexmedetomidine nebulisation can be utilized as a safe and ideal alternative to Ketamine nebulisation with less haemodynamic derangements.[2]

Antilla M, Pentilla J et al in the year 2003, conducted a study on bioavailability of Dexmedetomidine after extravascular doses in healthy subjects. Single 2 μg kg^{-1} dose of Dexmedetomidine was given intravenously, intramuscularly, perorally and buccally (where the solution is not swallowed) to 12 healthy male subjects. The drug concentration-time data were analysed using linear one-compartment (buccal and peroral data), or two-compartment modelling (intravenous data), or noncompartmental methods (intramuscular data). Mean (95% CI) absolute bioavailability after peroral, buccal and intramuscular administration was 16% (12–20%), 82% (73–92%) and 104% (96–112%), respectively. Dexmedetomidine is well absorbed through oral mucosa and therefore buccal dosing may provide an effective, non invasive route to administer drug .Bioavailability through nasal mucosa is 65% and by buccal mucosa is 82%.[15]

In the year 2004, Groeben H studied the effects of alpha 2 adrenoceptor agonist dexmedetomidine on bronchoconstriction. They concluded that dexmedetomidine has direct actions on peripheral

receptors. When alpha 2 receptors are activated due to relaxation of smooth muscle and dilation of bronchi, there is reduction in cough reflex.[8]

In the year 2019, Xu et al conducted a randomized trial to study the use of nebulised Dexmedetomidine and Lidocaine as premedication for flexible bronchoscopy. Sixty patients requiring flexible bronchoscopy were randomly assigned to three groups of 20 patients each .Group 1 received nebulised Dexmedetomidine and lidocaine ,group 2 received intravenous Dexmedetomidine and nebulised Lidocaine, group 3 received nebulised Lidocaine alone. They noticed that nebulised Dexmedetomidine showed a protective effect for reducing cough compared with intravenous Dexmedetomidine .The group in which nebulised dexmedetomidine was given had a shorter recovery time and reduced vasoconstrictor consumption. The incidence of moderate to severe coughing was reduced significantly from 55% to 15%. They concluded that the nebulised dexmedetomidine group has a higher protective effect for reducing cough with less haemodynamic changes.[16]

Zanaty and Metainy SA et al conducted study in year 2015 to evaluate and compare the efficacy and safety of nebulized Dexmedetomidine, nebulised Ketamine and combination of these drugs for premedication in pediatric outpatient dental surgeries. Sixty children were randomly categorized into 3 groups of 20 patients each. Patients in group K were premedicated with nebulized Ketamine (2 mg/kg), group D were premedicated with nebulised Dexmedetomidine (2 ug/kg) and group DK were premedicated with combined nebulised Dexmedetomidine and ketamine (1ug/kg+1mg/kg). Group DK had the briefest recovery times, followed by group K and group D with progressively longer recovery times. Postoperative analgesia was significantly better in group DK compared with group K. Hence, they concluded that nebulised dexmedetomidine combined with other anaesthetics as a premedication for paediatric outpatients provides smoother induction of general anesthesia with shorter recovery period and minimal side effects.[17]

In year 2014 Piao G, Wu J performed a meta-analysis of randomized controlled trials to evaluate Dexmedetomidine as an anesthetic agent given intravenously. According to their meta-analysis conducted on 18 studies they concluded that Dexmedetomidine can stabilize blood pressure and heart rate and prevent postoperative adverse reactions .However patients with original hypovolemia or heart block should be cautious. The incidence rates of postoperative nausea and vomiting, chills and shivering were lower than control group. However the occurrence rates of bradycardia and hypotension in Dexmedetomidine group were higher than control group.[18]

Jan Hau Lee, David A., Turner et al in the year 2016 conducted a prospective multi-instititional pediatric observational study to study the impact of multiple tracheal intubation attempts on outcomes in critically ill children. They defined an “Attempt” as a single advanced airway maneuver(eg beginning with the insertion of device such as laryngoscope into patients mouth or noseand ending when device is removed.[19]

Combes X, Andriamifidy et al in the year 2007, conducted a double blind study on 300 patients and concluded that post intubation symptoms like sore throat were more frequent in patients intubated without the use of a muscle relaxant.[20] Clayton Smith conducted a meta-analysis to compare the efficacy and adverse effects of double lumen endobronchial tubes and concluded that double lumen endobronchial tubes are associated with a greater risk of sore throat.[21] However, according to Seo JH, Kwon TK insertion of double lumen endobronchial facing anteriorly during passage through vocal cords reduces rate of POST by 50%.[22]

6.3 AIMS AND OBJECTIVES OF THE STUDY

To compare the effectiveness of nebulized dexmedetomidine with dexamethasone in preventing Post Operative Sore Throat following endotracheal intubation.

7.0 MATERIALS AND METHODS

7.1 SOURCE OF DATA

A randomized, double blind clinical study will be conducted in department of Anaesthesiology, Dayanand Medical College on a total of 150 patients ≥18years of age with ASA I –III scheduled for elective operative procedure under general anaesthesia with endotracheal intubation. The patients will be randomly allocated to either of the 3 study groups of 50 patients each by computer generated randomisation codes contained in sealed, sequentially numbered envelopes.

7.2 METHOD OF COLLECTION OF DATA

Inclusion Criteria–

- ASA I, II and III patients with age group of ≥18 years undergoing surgery under general anaesthesia with endotracheal intubation.

Exclusion criteria –

- History of recent upper respiratory tract infection or sore throat
- Duration of surgery >3 hrs
- Mallampati grade ≥3
- Patients who need more than two intubation attempts
- Patient allergic to the drugs used in the study.

GROUP ALLOCATION:

150 patients will be recruited for the study and divided into three groups of 50 patients each using computer generated random number list, using opaque sealed envelopes.

Group A

Comprising of 50 patients who will receive nebulized Dexmedetomidine 50ug (0.5 ml) with 4.5 ml of normal saline (total volume =5ml)

Group B

Comprising of 50 patients who will receive nebulized Dexamethasone 8mg (2ml) with 3 ml of normal saline(total volume =5ml).

Group C

Comprising of 50 patients who will receive normal saline (total volume=5ml)

SAMPLE SIZE CALCULATION

By using previous studies [2][23][24], the incidence of POST is 26% with saline, 10% with Dexamethasone and 10.2% with Dexmedetomidine in nebulised form.

Based on this assumption
The formula used in the situation is as under:

$$n = \frac{[Z_{1-\alpha/2}\sqrt{2P(1-P)} + Z_{1-\beta}.\sqrt{\{P1(1-P1) + P2(1-P2)\}}]^2}{(P1-P2)^2}$$

Where P=(P1+P2)/2

- Approximate value of efficacy/cure rate for standard treatment =P1
- Approximate value of efficacy/cure rate for other treatment = P2
- Effect size = (P2-P1)
- Level of significance (usually 5%)

Zα = Value of standard normal variate corresponding to α level of significance (1.96)
Zβ = The standard normal deviate for desired power(1.282)

With the above assumptions the sample size for 95% confidence level and 90% power works out 50 in each group.

BLINDING

The patients will be allocated randomly using computer generated random number list which will be arranged by a biostatistician using consecutively numbered opaque sealed envelopes. After opening the envelopes, the nebulisation solution will be prepared according to the assigned group by the anaesthesiologist who will not take part in the subsequent analysis of these patients. The anaesthesiologist who will be nebulising the patient, monitoring intraoperatively and in the postoperative period will be unaware of the solution being administered. Patients will also be blinded as both the study preparations will be colourless, tasteless and odourless.

PRE ANAESTHETIC CHECKUP

Routine thorough check up will be conducted comprising of detailed history ,comorbidities ,allergy to any drug being used ,general physical and systemic examination .Patients will be explained about the study

being conducted and written consent will be taken .Relevant investigations will be sent and reviewed .Patients will be advised to remain fasting for 8 hours prior to surgery.

ANAESTHESIA TECHNIQUE

On the day of surgery patient will be shifted to the operating room and standard monitors will be applied such as noninvasive blood pressure, pulse oximetery, electrocardiogram and capnography and baseline parameters will be recorded. Patient will be positioned on operating table in supine position and intravenous access secured and intravenous crystalloids started. Baseline vitals will be monitored. The drug prepared for nebulisation will be delivered by using a nebulisation mask for 10 minutes, with the help of a wall attached oxygen driven source at a flow rate of 5-6 litres/minute. Factors such as HR, SBP and DBP will be recorded during nebulisation every 5 minutes till induction, every hour intraoperatively and in the post operative period. Fifteen minutes after nebulisation patient will be premedicated with injection Fentanyl 2mcg/kg , Midazolam 0.02 mg/kg. After preoxygenation with a fresh gas flow of 10litres/min for 3 min and general anaesthesia will be induced with intravenous Propofol 2mg/kg. Tracheal intubation will be done by an experienced anaesthesiologist 3 minutes after administering injection Atracurium 0.5 mg/kg intravenously. An appropriate sized sterile single lumen cuffed endotracheal tube will be introduced using stylet and any manipulation required will be done when needed. The cuff of the endotracheal tube will be inflated with air, till no audible air leak will be detected just to obtain a seal. Cuff pressure will be monitored using a hand gripped cuff pressure manometer and monitoring will be done every hour to maintain cuff pressure of 25 cm of water till the end of surgery. General anesthesia will be maintained using oxygen and nitrous oxide with inhalational agent .At the end of surgery oropharynx will be gently suctioned and neuromuscular block will be reversed using injection neostigmine 0.05mg/kg and injection glycopyrrolate 0.01 mg/kg. Tracheal extubation will be performed and after extubation patients will be

shifted to postoperative care unit for observation. Patients will also be monitored for any other side effects.

OBSERVATION:

Patients will be assessed in the postoperative ward by an anaesthesiologist blinded for the study .Intensity of sore throat, cough ,hoarseness and pain will be assessed at (0 hr), 1 hr, 2 hr, 4 hr, 8 hr, 12 hr, 24 hr postoperatively. The severity of POST will be graded on a 4 point scale (0-3) assessed as per following clinical scores -

GRADE	SORE THROAT
0	NO SORE THROAT
1	MINIMAL SORE THROAT(Complains of sore throat only on asking)
2	MODERATE SORE THROAT(Complains of sore throat on his/her own)
3	SEVERE SORE THROAT

GRADE	COUGH
0	NO COUGH
1	MINIMAL COUGH
2	MODERATE COUGH
3	SEVERE COUGH

GRADE	HOARSENESS
0	NO HOARSENESS
1	HOARSENESS AT TIME OF INTERVIEW BUT NOTED ONLY BY PATIENT
2	HOARSENESS THAT IS READILY APPARENT BUT MILD
3	HOARSENESS THAT IS READILY APPARENT AND SEVERE

Grade	PAIN ACCORDING TO NUMERIC PAIN RATING SCALE
0	NO PAIN
1	MILD PAIN (1-3)
2	MODERATE(4-6)
3	SEVERE(7-10)

The patients will then be examined to determine the occurrence of any other postoperative complications and findings will be recorded .

Study design: Prospective

Duration of study: 2 Years

Place of study: Inpatients in Department of Anesthesiology in teaching hospital attached to Dayanand Medical College & Hospital, Ludhiana.

Statistical analysis: Data will be described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. Comparison of quantitative variables between the study groups will be done using Student t-test and Mann Whitney U test for independent samples for parametric and non-parametric data respectively. For comparing categorical data, Chi square ($\chi 2$) test will be performed and exact test will be used when the expected frequency is less than 5. A probability value (p value) less than 0.05 will be considered statistically significant. All statistical calculations will be done using (Statistical Package for the Social Science) SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows.

OUTCOME

To compare the effectiveness of nebulized dexmedetomidine and dexamethasone with normal saline in preventing Post Operative Sore Throat following endotracheal intubation.

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.

NO

7.4 HAS ETHICAL CLEARANCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3?

YES

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PROFORMA

Sr. No: Group:

Name: Age and Sex:

MRD Number: Date of Surgery:

Name of surgery: Duration of surgery:

DEMOGRAPHIC DATA

Height (cm) : WEIGHT (kg): ASA grade: Mallampatti Grade :

COMORBIDITIES

Diabetes mellitus: Hypertension: OSA:

COPD: Any Other:

Size of Endotracheal tube:

No. of attempts in insertion of Endotracheal tube:

Endotracheal tube Cuff pressure:

Operative hour	Cuff pressure(cm of water)
0 hr	
1hr	
2 hr	
3 hr	

Signature of Candidate **Signature of Supervisor**

Post operative hour	Sore throat Grade	Cough Grade	Hoarseness Grade	Pain Grade
0 Hr				
1 Hr				
2 Hr				
4 Hr				
8 Hr				
12 Hr				
24 Hr				

HAEMODYNAMIC AND RESPIRATORY PARAMETERS:

	HR	SBP	DBP	MAP	SPO2
BASELINE (BEFORE NEBULISATION)					
DURING NEBULISATION					
5 min					
10 min					
AFTER NEBULISATION					
5 min					
10 min					
BEFORE INTUBATION					
AFTERINTUBATION					
INTRAOPERATIVELY- 0 hr					
1 hr					
2 hr					
3hr					
POST –OP 0 Hr					
1 hr					
2 hr					
4 hr					
8 hr					
12 hr					
24 hr					

Any Other complication:

Signature of Candidate **Signature of Supervisor**

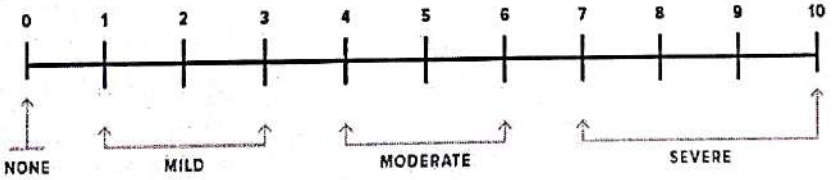
Sore throat severity score

Grade	Sore throat
0	No sore throat
1	Minimal sore throat(complains of sore throat only on asking)
2	Moderate sore throat(Complains of sore throat on his/her own)
3	Severe sore throat

Grade	Cough
0	No cough
1	Minimal cough
2	Moderate cough
3	Severe cough

Grade	Hoarseness
0	No hoarseness
1	Hoarseness at time of interview but noted only by patient
2	Hoarseness that is readily apparent butmild
3	Hoarseness that is readily apparent andsevere

0-10 NUMERIC PAIN RATING SCALE



Signature of Candidate

Signature of Supervisor

INFORMED PATIENT CONSENT

Date: _____

I.....D/o, W/o, S/o..... .....am willing to participate in the study **"COMPARATIVE STUDY OF NEBULIZED DEXMEDETOMIDINE AND DEXAMETHASONE IN PREVENTING SORE THROAT FOLLOWING ENDOTRACHEAL INTUBATION"** The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

....

Signature of the Witness Signature of the patient

Name:

Signature of Candidate **Signature of Supervisor**

मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____

निवासी _____

इस शोधकार्य **"COMPARATIVE STUDY OF NEBULIZED DEXMEDETOMIDINE AND DEXAMETHASONE IN PREVENTING SORE THROAT FOLLOWING ENDOTRACHEAL INTUBATION"** में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____ _____

गवाह के हस्ताक्षर रोगी के हस्ताक्षर/अंगूठे का निशान

नाम: नाम:

_____

अन्वेषक के हस्ताक्षर

_____

विद्यार्थी के हस्ताक्षर

ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____

ਵਾਸੀ _____

"COMPARATIVE STUDY OF NEBULIZED DEXMEDETOMIDINE AND DEXAMETHASONE IN PREVENTING SORE THROAT FOLLOWING ENDOTRACHEAL INTUBATION" ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

_____ _____

ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ_____ ਮਿਤੀ_____

ਪਤਾ _____ ਪਤਾ _____

_____

ਨਿਰੀਖਕ ਦੇ ਹਸਤਾਖਰ

_____

ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ